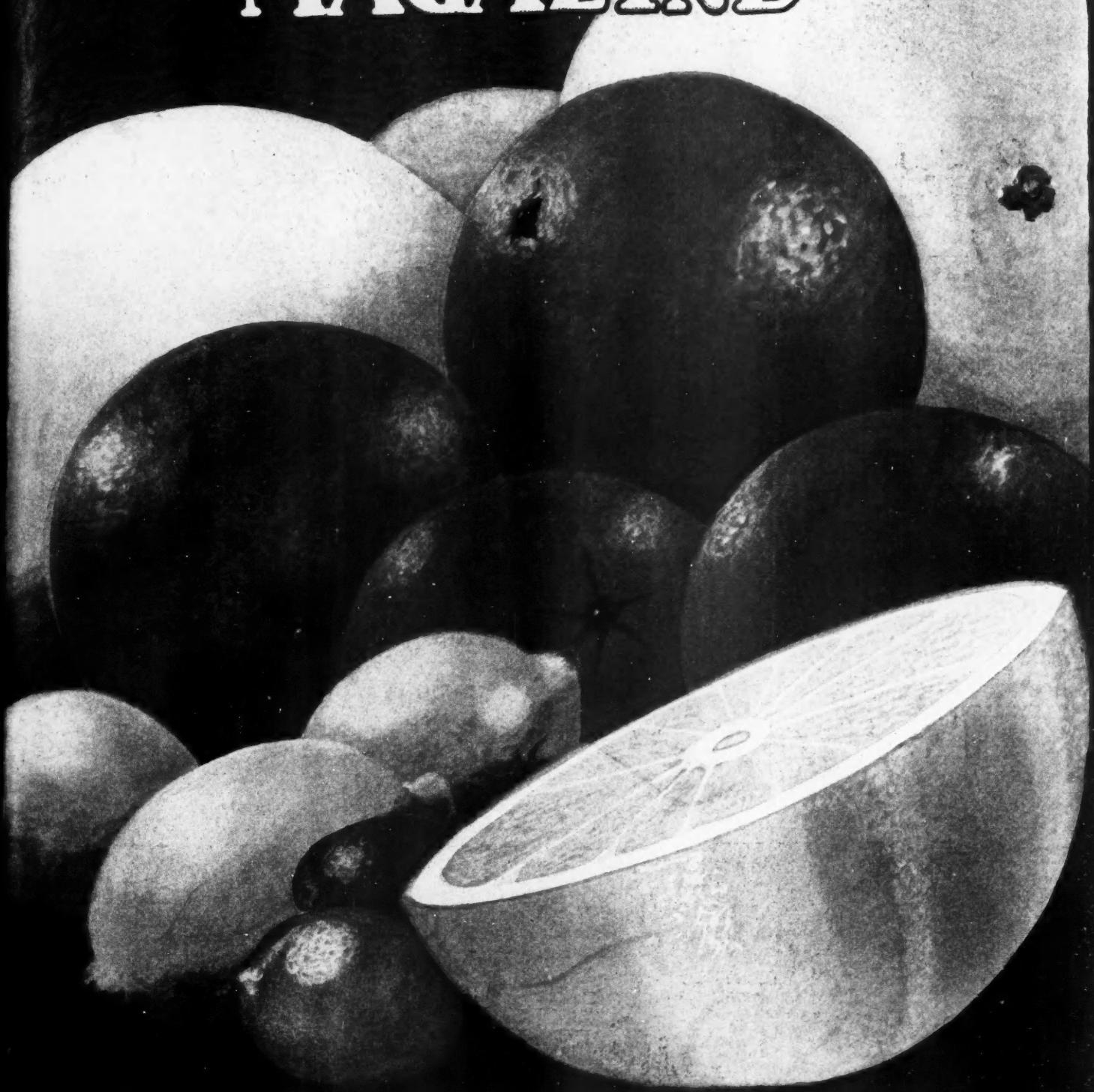


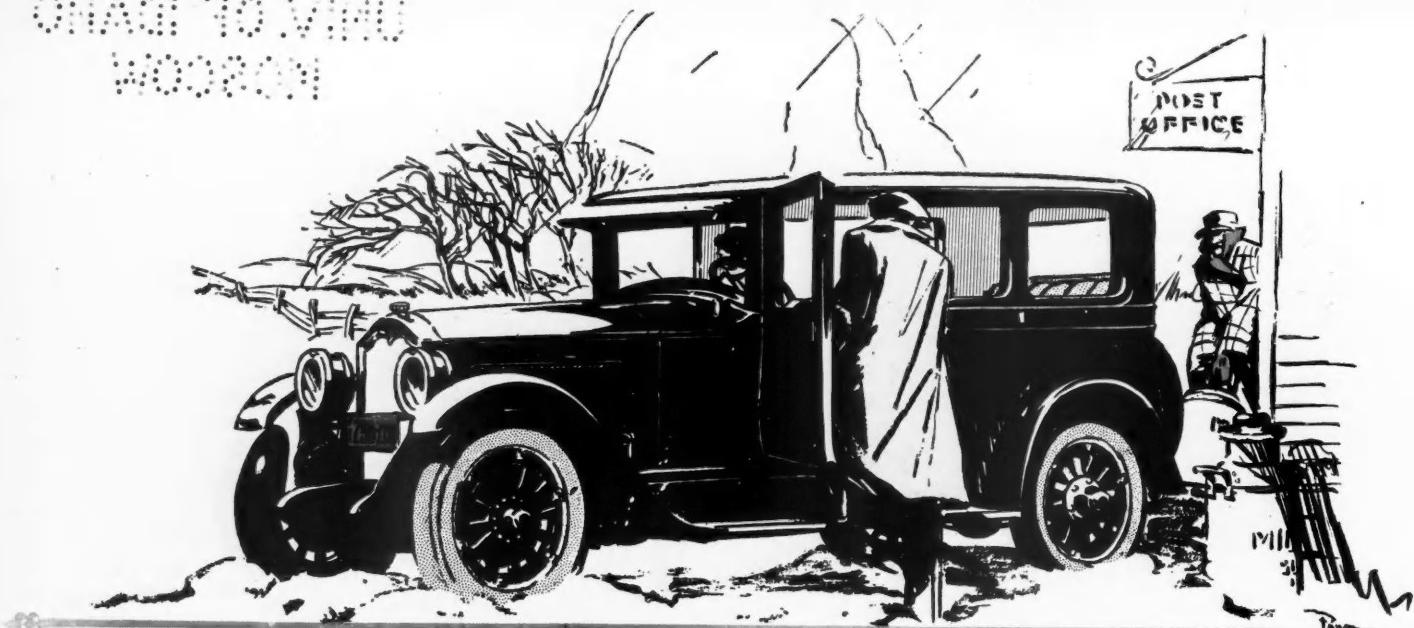
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AMERICAN FRUIT GROWER MAGAZINE



January, 1926
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JANUARY, 1926

No. 1.

Rejuvenation of Old Fruit Trees

By W. L. Howard

University of California

IN THE life of every orchard there comes a time when the trees seem to come to a standstill as regards growth and fruitfulness.

The experienced orchardist easily recognizes the symptoms of waning vigor. Both wood growth and yield tend to come to a standstill or the fruit is small and refuses to size up even when carefully hand thinned. The most reliable symptom is lack of growth—failure to elongate the twigs and renew the fruiting parts.

Aside from small fruit and decreased yields, the most alarming symptom is the dying back of too many twigs and small branches in the tops. This last is most likely to happen with prune, plum, English walnut and cherry trees, which are given little pruning, but may occur even when the trees are kept reasonably well opened up by annual pruning.

Dying of twigs is probably due to water shortage in those parts. With the transpiration surface thus reduced, the larger branches may not become involved. This is a much later stage.

With advancing years some trees die from the tops, some from the roots and some simply decline in vigor and usefulness but do not actually die at all for a long time. Trees may die from the top from wood diseases, sunburn and the ravages of insects. The roots may die from disease or from insect attack, but the chief cause of death is poor soil and lack of moisture or, worse still, a fluctuating water supply.

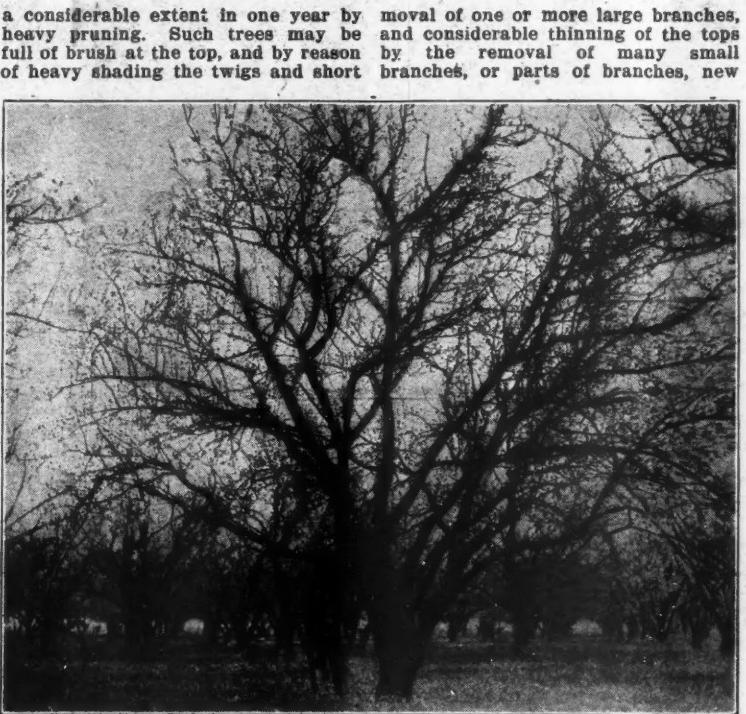
In most cases a dead tree presents no particular problem. It is only necessary to take it out and plant a new one. But living trees that are at a standstill in production or which, from want of vigor, do not size up their fruit, present a serious problem in orchard management.

Old fruit trees can be revived or rejuvenated only when there are no fundamental soil defects incapable of being remedied or defects in the trees themselves, such as constitutional weakness, advanced heart rot, or diseased roots. We know we cannot hope to prolong their lives indefinitely. The best we can hope to do is to give them a fair chance to live out their normal time under the climatic and soil conditions prevailing where they are located.

How to Revive Old Trees

There is no magic about reviving old trees. It is first necessary to diagnose the cause of the decline in vigor, if possible, and apply remedial measures. We do not progress very far until it becomes evident that we must give special attention to such cultural factors as irrigation, pruning and soil improvement. It is apparent that all three of these factors will have to be worked out together. No one of them would be sufficient, except that it would be necessary for rainfall to replace irrigation in humid climates, or to plow up a sod covering or destroy other vegetation that might be sapping the soil of its moisture and fertility.

In dry climates we may assume that if fairly adequate irrigation is given, old prune and plum trees that have not begun to decay can be revived to



A 27-year-old almond tree before pruning for rejuvenation purposes. Ordinarily the almond is not pruned annually because the nuts attain a suitable size without pruning—at least for several years. Lack of pruning tends to cause the trees to become old prematurely.

branches on the scaffolds or principal divisions of the tree may have been killed out from top to bottom. By opening out the tops, often by the re-

growth will be started not only on the bare trunk and branches, but also throughout the small fruiting parts in the vicinity of where the cuts have

been made. Great care should be exercised not to open out the tops of old trees in such manner that any one bare branch is exposed to the sun for as much as an hour at a time during the day. In newly opened trees there is great danger of sunburn.

As soon as new growth has been started in old trees, the older wood, in pruning, may be removed in favor of the new. In this manner the bearing portion of the tree can be gradually renewed. This applies to all species.

In California, at the same time the rejuvenation pruning has commenced, attention should be given to improving the soil by planting legume cover crops and perhaps by fertilizing. To secure adequate growth of the best legume crops, it is necessary to do the seeding early, and this calls for early fall irrigation. Prunes cannot well be irrigated until after the last of the crop is out of the orchard. This will vary from the last of August to the last of September. *Melilotus indica*, the leading winter crop, as a rule does best when seeded in August, but it can be sown as late as the last of September.

Great care should be taken to turn under the cover crop before it begins to deplete the soil of its moisture in the spring. In other words, the crop should be turned under before the soil begins to show signs of becoming dry. Where irrigation water is available and not too expensive, the *Melilotus* or other legume may be permitted to ripen and even begin to dry up. A light irrigation will then be necessary in spring before the plowing can be done. At the same time an adequate supply of soil moisture will have been restored.

What has been said in the way of a program for reviving old prune trees will apply pretty generally to other fruits, such as apricots, plums, peaches and apples. With old pear trees, heavy cutting and irrigating are likely to be followed by an outbreak of blight in regions where climatic conditions are favorable to blight occurrence. Old cherry trees can be revived to a certain extent by the methods mentioned, but they do not respond as readily as other trees.

Methods and Precautions in Humid Climates

In the Middle West, it is very dangerous to cut apple trees too severely because of danger of canker infection through the wounds. In Missouri, Arkansas and adjacent states, the blister canker is likely to ruin Ben Davis and Gano trees. The Jonathan will stand a lot of heavy cutting if all wounds two inches in diameter and larger are carefully disinfected and sealed up. One of the best disinfectants is made by using equal parts of cyanide of mercury and bichloride of mercury. Dissolve one tablet of each in a pint of water. Then pour the two solutions together in a quart glass jar and apply with a swab or brush. This may also be used for disinfecting pruning tools.

Grafting wax, though expensive, is probably the best material for sealing up wounds. In the coastal regions of

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Pruning Pear Trees for Profit

By Warren P. Tufts

University of California

ONE OF the most difficult deciduous fruit trees to properly shape and at the same time bring into early fruiting is the pear.

It is true that fine symmetrical specimens of any desired shape can be secured, but in order to attain this end much severe cutting is necessary. The fact that heavy pruning tends to dwarf the young tree and at the same time delay fruitfulness, is now very generally recognized by fruit growers.¹ In California where heavy cutting has often been practiced, it is not uncommon for the pear grower to wait nine or 10 years before harvesting his first crop. The succulent growth produced by this heavy cutting is also quite likely to be more susceptible to the ravages of the pear blight organism, which disease is undoubtedly the most important single limiting factor in pear production.

Why Prune Pear Trees?

The question may well be raised, then, as to the necessity of pruning at all, if pruning dwarfs and delays fruition. The only possible answer is that orcharding is an artificial practice and the fruit grower finds it necessary at times to limit the natural growth tendencies to serve his own ends. If left unpruned the young tree, under proper soil and moisture conditions, makes an exceptional development and bears fruit at an early age (see Figures 1 and 2).

The writer is rather inclined to the opinion that should the orchard be located where optimum soil and moisture conditions prevail, no pruning for four or five seasons may in many instances prove the most satisfactory method; especially is this true if the grower cannot spare the time necessary to employ one or the other of the tying systems briefly outlined below.

The Caldwell System Explained

In the AMERICAN FRUIT GROWER MAGAZINE for December, 1923, the writer discussed in considerable detail the so-called "Caldwell System" of pear pruning (Figure 3). This method, briefly stated, consists in the tying down of the upright one-year-old shoots to an angle somewhat below the horizontal. The resultant new growth arises just below the highest point of the bend. Practically all growth beyond this point is reproductive in character and rapidly develops a good fruit-spur system. In principle, the Caldwell plan is very similar to the espalier-trained trees of European countries. In both cases the bending of the branches seems to check the circulation and induce fruitfulness.

¹See California Agricultural Experiment Station Bulletin No. 313, entitled, "Pruning Young Deciduous Fruit Trees," for further particulars in this connection, and also for detailed directions for shaping young trees.



Figure 4.—A three-year-old Bartlett pear tree grown in a windy location. Note stake driven to windward to which branches have been tied. Every tree in this 80-acre orchard has been thus handled.

At each dormant season all the new shoots are tied down in such a way that there is as little shading as possible of the lower branches. This courting new growth to take their place.

The cost of handling an orchard in this manner is probably somewhat



Figures 1 and 2.—Nine-year-old Bartlett pear trees. The tree shown in Figure 1 has not been pruned for five years. Note the splendid development of fruiting wood and framework branches. Figure 2 shows an adjoining tree which has been pruned lightly. The unpruned tree (Figure 1) is much larger and it has produced from six to eight times as much fruit as the pruned tree. Both pictures were taken at the same distance.

latter tying is done to any convenient point, either on trunk or lower branch. Mr. Caldwell's trees are now 12 years old and, with the exception of the first winter, have scarcely been touched

greater during the first few years, but for the first 10-year period the expense will not be more than the average cost of pruning.

At five years Mr. Caldwell's trees

The disadvantages are, that this system to be successful must be part of a comprehensive and intensive orcharding program. Adequate moisture and fertility must be present in order to secure abundance of new wood and at the same time carry through to maturity large crops and to supply the enormous leaf area which is from year to year increasing. The man who does the tying must know trees and how to interpret their responses. Success will very largely depend upon the individual.

Another method of securing desirable spread and growth into the wind is the tying of main scaffold branches to windward (Figure 4), generally to stakes driven into the ground at such a distance from the trunk of the tree that cultivation will not be greatly hindered. In one orchard the writer visited several years ago, windward branches were wired to the lee of the next tree—such wires being placed so as to be out of the way of cultivation and in branches large enough to permit staples being driven in order to hold the wires.

The Alternative is to Prune

It may not be convenient or desirable to make use of one or the other of the above suggested methods of tying pear trees to secure the desired shape, and likewise the grower may have certain qualms with regard to the non-pruning of his young trees. Then the only other alternative is to prune. Naturally this pruning should be as light as possible and yet secure growth in the proper direction. With young Bartlett pear trees where the new wood is often branched, especially in the upper third of the new growth, care must be taken not to cut out the leader and attempt to develop one of the laterals, unless such lateral arises from two-year-old wood or older. When a cut is made to a lateral arising from the past season's growth, such lateral is quite often unable to support the weight of the new growth which arises therefrom (Figure 5).

Attention has been directed above to the difficulty of securing a desirable framework with the young pear tree, especially in windy locations. The author, at the present writing, feels that his recommendations would be as follows:

1. Plant a one-year-old straight "whip," four to six feet in height. Head this whip 24 to 30 inches from the ground.

- 2-a. At the end of the first growing season select three main branches well spaced up and down the trunk and tie these down, according to the Caldwell system. The growth during the next three or four years will like-

(Concluded on page 27.)

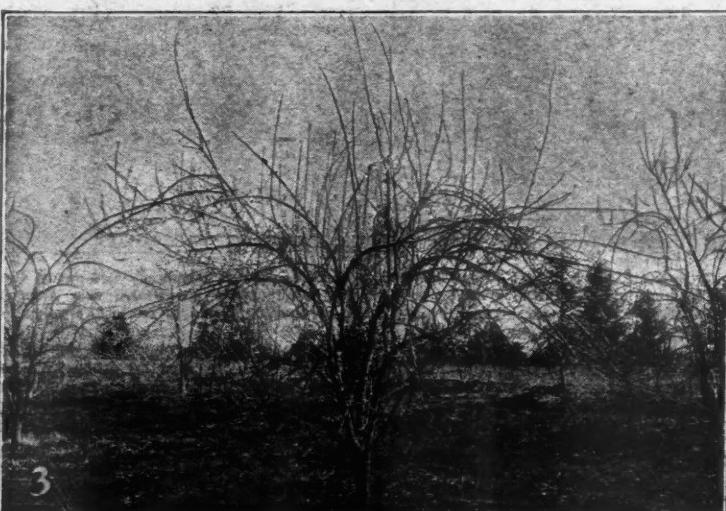


Figure 3.—Caldwell system of pear pruning. Six-year-old Bartlett pear tree trained by tying down new shoots each year. Note new branches which arise at bends; these in turn will be tied down to a position a little below the horizontal.

with the pruning shears. They are wonderful specimens for their age and the foothill conditions under which they were grown.

By tying down, the main framework branches are gradually built up and out at an upright angle in order to secure the greatest mechanical strength. A very flat branch has a restricted supporting strength, and a perpendicular one gives little or no spread to the tree, thus limiting the fruiting area. The writer has seen 400 pounds of pears borne by a six-year-old tree trained by this method and only two props, which were not altogether necessary, used.

As the trees become older and the shade more dense, some thinning of the wood is necessary to admit light to the interior parts. In the writer's opinion this thinning might also very well accomplish a renewal of the fruiting wood by cutting away spurs which have outlived their usefulness and en-

averaged two and a half boxes, at six years three boxes, and at nine years practically eight packed boxes per tree. This is the average per tree over a block of 10 acres. These yields are far better than those commonly secured with more or less heavy pruning where probably one box per tree the eighth or ninth season would be considered normal.

Advantages of the System

The advantages claimed for this method are briefly: Large trees of good mechanical strength combined with a large fruiting area close to the ground are secured in a comparatively short period of years; trees come into bearing from two to four years earlier than trees which are trained by severe cutting back; trees can be trained to a more shapely form in a windy section or where prevailing winds hinder symmetrical development; and finally, larger crops of comparable quality are harvested.



Figure 5.—A three-year-old Bartlett pear tree. Note that main scaffold on left has been cut to a lateral and that this lateral was not strong enough to hold the weight of the new growth and foliage. On the right no cutting to a lateral was practiced and the leader has the necessary stiffness to remain upright.

Fighting Jack Frost

By C. C. Cate

THE WRITER knows of no district where frost does not sometimes play its part in fruit production. Many times the remark is heard from some person who expects to go into the fruit growing business that he will grow fruit in a district where frost is not known. When he asks this question of someone the answer is usually, "There is no such district."

Controlling temperatures by means of artificial heating has probably reached its height on the Pacific Coast. For many years the citrus growers have heated their groves and in turn grape growers, pear and apple growers and others interested in small fruits and vegetables have followed this procedure. For the past 15 years the pear growers of the Rogue River Valley, Oregon, have realized the necessity of orchard heating and have practiced it on a large scale in the pear orchards in the district.

If one knew that his home would either be burned to the ground or probably damaged by fire once in every three to five years, he would not need a high-powered insurance agent to sell him insurance on the property. This same line of thinking will apply to pear growing and other fruit growing in many sections of the United States. In other words, orchard heating is considered insurance. True, the entire crop will not be lost every season, or even once in five seasons, but more or less damage may occur at least once in three seasons, or possibly more often. Orchard heating is not used in the Rogue River Valley for the sole purpose of preventing entire crop damage. Many times frost has caused russetting of the fruit, or misshapen fruit, or has destroyed the seeds to such an extent that the fruit does not gain its normal shape and size, and still the tree may be loaded with fruit. As a consequence, such fruit brings a lower price on the market, and many times a differentiation of 25 to 50 cents per box is realized for fruit dam-

aged by frost. It is this factor as much as protecting against an entire loss that causes the grower to resort to orchard heating. When orchards are valued from \$1000 to \$2000 per acre, and the natural over-head associated with orchard work is considered, it behooves the orchard owner

open smudge pot type of heater of both the five and 10-quart size, and they are burning an oil with a specific gravity of about 25 to 28 degrees. It has been found that this type of oil is better suited for orchard heating than the heavier type, which burns slower and leaves a large amount of residue

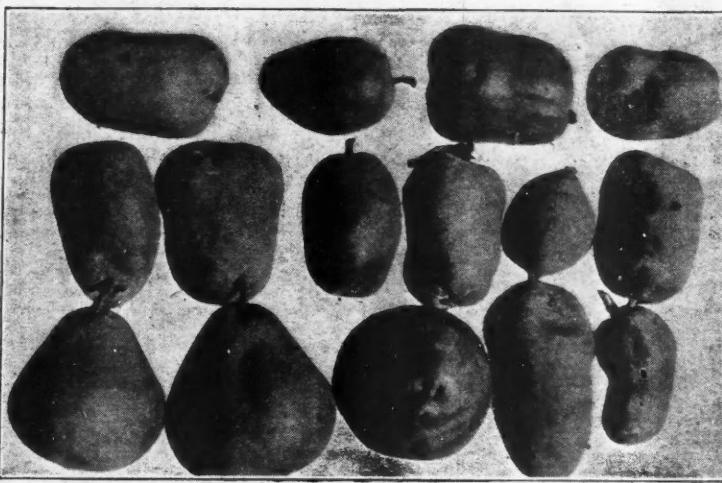
and wagons must be provided in the orchard in order to handle the oil economically. Where coal is used, it is not necessary to provide storage facilities. On the other hand, the labor cost is more where coal is used. Bear in mind that in heating an orchard it is the heat that is needed and not the smoke. Anything that will give off heat and that will not be too expensive can be used in orchard heating. In this district we have used almost everything in the way of orchard heating that will burn—cord wood, sawdust and coal dust in combination with oil, straw and other refuse matter, prunings from the orchard and discarded automobile tires. We have growers, who, during the past year, purchased old automobile tires in car-load lots at practically no cost except the freight. These were cut into three or four sections and by using a little excisor or waste material, they were easily lighted after an application of a small quantity of oil. These tires gave off considerable heat, but the odor of the burning rubber was extremely undesirable. Where rubber tires are to be used, it is best to use them in remote districts in order to prevent neighborhood feuds.

Tree fruits have been heated with more success than any other fruits at the present time, while other fruits are receiving attention, especially cranberries and strawberries. It has been proven that these can be heated successfully in many districts.

Plan Operations from Standpoint of Coldest Night

The most important factor in orchard heating is the matter of sufficient equipment for protection on the coldest night that is likely to occur. Many crops have been lost by the use of an insufficient number of heaters. It is poor policy to purchase equipment and spread it out over too large an area. It is far better to heat one-

(Continued on page 42.)



These pears were all taken from one tree. All but three are misshapen as a result of frost. The three undamaged fruits were found in the top of the tree.

to give considerable thought to the matter of orchard heating.

Selection of Equipment and Fuel

The selection of the type of equipment and fuel to be used is an important matter and should receive careful attention by growers contemplating the heating of an orchard. In the Rogue River Valley, Oregon, practically all the growers are now using the

in the pots. In other districts of the Northwest, growers are using coal or briquets as fuel, which must be burned in a different type of heater.

In selecting equipment, it is well to consider the price of fuel. Where coal is cheaper than oil, it would possibly be better to use the coal heaters and burn coal. In using oil as a fuel, more equipment is needed than where coal is used. Storage tanks, supply tanks,

Farm Accounting for Fruit Growers

By M. C. Burritt

The questions are progressive and logical steps to a complete farm ac-

counting system. Every man to whom farm record keeping is new ought to

SAMPLE PAGES FROM AN INVENTORY BOOK.

Item.	Date acquired.	Amount or original valuation.	Valuation on March 1				
			1923.	1924.	1925.	1926.	1927.
Farmland, 100 acres—							
Orchard A—10 acres...	1890	\$1,250	\$2,500	\$2,500	\$2,250	.....	.....
Orchard B—5 acres...	1905	750	2,000	2,125	2,125	.....	.....
Crop land—65 acres...	1845	4,875	6,500	6,500	6,500	.....	.....
Roadside waste—5 acres...	250	250	250	250	250	.....	.....
Etc. ....	.....	.....	.....	.....	.....	.....	.....
Total .....	.....	.....	\$14,000	\$14,125	\$13,875	.....	.....
Buildings—							
Main house....	1910	\$5,000	\$4,500	.....	\$4,000	.....	.....
Tenant house....	1900	2,500	2,200	.....	2,000	.....	.....
Main barn, etc....	1885	3,000	3,500	.....	3,000	.....	.....
Totals .....	.....	.....	\$10,200	.....	\$9,000	.....	.....
Equipment—							
1 orchard harrow....	1908	\$ 45	\$ 30	.....	\$ 20	.....	.....
1 tractor	1925	.....	.....	.....	550	.....	.....
1 truck	1920	1,200	750	.....	500	.....	.....
1 sprayer, rebuilt 1921....	1915	400	375	.....	300	.....	.....
Etc. ....	.....	.....	.....	.....	.....	.....	.....
Total .....	.....	.....	\$2,100	.....	\$1,800	.....	.....
Supplies on hand—							
Fertilizer ....	.....	.....	\$ 50	.....	\$ 100	.....	.....
Spray material ....	.....	.....	10	60	25	.....	.....
Lumber ....	.....	.....	25	15	.....	.....	.....
Tire, etc....	.....	.....	50	50	50	.....	.....
Total .....	.....	.....	\$ 135	\$ 125	\$ 175	.....	.....
Assets—							
Accounts receivable....	.....	.....	\$ 500	\$ 300	\$ 600	.....	.....
Cash—							
F. L. B. stock....	1920	\$ 200	200	200	200	.....	.....
Co-op. stock....	1915	100	100	100	100	.....	.....
Note (W. T. S.)....	1918	500	450	400	350	.....	.....
Total .....	.....	.....	\$ 750	\$ 700	\$ 650	.....	.....
Liabilities—							
Mortgage	1905	\$4,000	\$3,000	\$2,750	\$2,500	.....	.....
Note, bank....	1920	1,000	700	600	500	.....	.....
Accounts payable....	.....	500	450	450	350	.....	.....
Total .....	.....	.....	\$4,500	\$3,800	\$3,350	.....	.....
Total assets .....	.....	.....	\$30,000	.....	\$27,500	.....	.....
Less liabilities .....	.....	.....	4,500	.....	3,350	.....	.....
Net assets .....	.....	.....	\$25,500	.....	\$24,150	.....	.....
Net gain or loss for year....	.....	.....	—500	+500	+1,000	.....	.....

start with the first and simple question and answer, and add other steps as he understands their purpose and his needs, and as his interests prompt him. Never begin with an elaborate system. Start simply and work out your own.

The Inventory

The least that every farmer ought to do in the way of account keeping is to take an inventory each year. In no other way can he tell definitely and accurately where he is going financially. His bank account will not tell him, for he may have liquidated his supplies, or let his land or equipment run down and a casual summing up in his head is indefinite and he is sure to overlook something important.

A good inventory may be very quickly and accurately taken if properly organized. All the items, land (by fields or orchards, if desirable) each building, each item of equipment, all livestock, all supplies, such as seeds, feeds, fertilizers, spray materials, etc., should be listed in detail on the left hand side of a broad sheet. Next to these items, horizontal columns about an inch wide should be ruled on the paper, each column to contain the figures for a year. If in the first column the date of purchase and purchase price is listed, this will be helpful in determining values each year. With this parallel arrangement only one inventory each year is necessary, for the inventory for the end of one year becomes the inventory for the beginning of the next year. On fruit farms March 1 is a good date for taking inventory, as fruit sales are usually pretty well closed out by then, and not many supplies have been taken in or much work done on the new year's operations.

(Continued on page 24.)

THE QUESTION is often asked by growers, "What records or accounts should I keep?" The answer is, "Such records, and only such records, as will tell you with reasonable accuracy what you want to know about your business." There is no one best system. But the more simple the system is, the better it is likely to be. Farm accounting for fruit growers differs not at all in principle and very little in practice from farm accounting for general farmers.

The definite financial facts a farmer usually wants to have about his business are:

- How much am I getting ahead or running behind each year?
- What items of receipts and expenses are chiefly responsible for this result?
- What does it cost to grow a particular crop, such as apples?
- What are the chief items in my costs of production and why are they high or low?

For a rough answer to the first question, all that is necessary is an accurate inventory of land, buildings, equipment, cash, notes, etc., at the beginning and end of the year.

The second question requires a cash book with entries of all income and outgo and their summarization and analysis, for answer.

Question number three calls for accounts with particular enterprises, either all or the special one to be studied, and involves labor records as well as a cash book.

Rates per hour for men, horses, equipment, for the use of tractor and truck, costs of overhead items, capital charges, etc., are involved in question four, and these are also essential for a complete and detailed answer to questions two and three.

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Is the Climate Changing?

SUCH things as a drought in summer, cold, driving storms in winter, and continued rain during the football season when we all wanted dry fields so that "Red" Grange could make more long runs, compel us to turn our thoughts to the weather.

Of course, most of us take such happenings as the regular order of things, but every little while some self-styled authority comes along and tells us the climate is changing, or some other such thing.

Only a couple of years ago when we had a mild winter, one of these authorities commented long and seriously in the Chicago Tribune over the alleged fact that the climate was changing. The path of the winter storms had changed, it was said, so that they were going across the country to the north of Chicago instead of south of it as formerly. In effect, it was stated, Chicago had been left several hundred miles to the south of where it had formerly been.

And the very next year Chicago had one of the coldest winters in its history!

During the past year or so we have been hearing a lot about sun spots. These spots progress across the surface of the sun at periodic intervals, it is claimed by astronomers. A sun spot interferes with the light and heat emanated from the sun. The first effect of this is to lower the temperature somewhat, but its greatest effect is on the waters of the oceans. These are cooled by the presence of sun spots. Water cools and warms slowly and the effects of sun spots are felt for some time after their presence. Since the route of storms and the weather in general are supposedly influenced to a considerable extent by the temperature of the waters of the oceans, sun spots may influence our weather appreciably.

There certainly seems no ground for believing that the climate of certain sections is rapidly changing. Past records show that practically every extreme of the present is within the extremes occurring within the records of the present generation. The weather, the same as everything else in nature, exhibits marked variations, but these variations range within certain rather definite limits. The weather we are having is within the limits known in past years.

Of course, the remains of glaciers and the presence of various fossils prove that the climate must have been vastly different in past years from what it is now. The changes occurred either gradually or through rather sudden shifting in the earth's polarity. Cooling of the earth and sun probably also played a part. Other planets may have exercised an influence.

Sun spots may be causing periodic variations in climate, but these changes are within the limits known in past years. There is no evidence that rapid changes are occurring in the climate of any section of the world.

Fertilizer Nomenclature

A SHORT time ago a committee of fertilizer experts, meeting in a southern state, passed a resolution favoring the use of the terms nitrogen, phosphorus and potassium instead of ammonia, phosphoric acid and potash, which are now commonly used. The resolution has great merit and ought to receive serious consideration.

Nitrogen, phosphorus and potassium are the three limiting elements in most soils, and when we buy fertilizers, we buy them for the content of these elements. Of course, the form in which the element occurs is important, but the amount of the element is the matter of principal consideration.

The nomenclature now used is misleading. The nitrogen content is often expressed in the form of ammonia when as a matter of fact no fertilizers contain their nitrogen in that form. Ammonia is a gas and the moment nitrogen passes into this form it escapes into the air. In some cases the nitrogen content is expressed in terms of the element. The two methods create confusion in the minds of growers who are not familiar with the chemistry of fertilizers.

In regard to phosphoric acid, the term really means phosphoric pentoxide as used by many companies. This is an entirely different compound from phosphoric acid and it contains a different percentage of nitrogen. Neither of these two forms is found in fertilizers to any appreciable extent.

With respect to potassium, the amount is expressed in most fertilizers in terms of potassium oxide. No fertilizers contain potassium in this form.

It is true that none of the three elements occurs in fertilizers in the free form. All of them are combined with other materials, but the form differs in different fertilizers. For the sake of simplicity, better understanding and greater uniformity, the amounts of all three of these elements should be expressed in terms of the elements themselves. The reason some farmers do not use commercial fertilizers more extensively is because they understand so little about them. Greater simplicity and more uniformity in the nomenclature would lead to a better understanding of fertilizers, and this would establish a greater confidence in them.

Those Get-Rich-Quick Stories

EVERY crop season brings its round of stories about the high prices received by certain growers for a fruit crop. Quite often it is the grower himself who starts the story. Perhaps he tells it to excite the envy of his neighbors, or perhaps he likes to attract the public attention, or perhaps he thinks the advertising will in some way help him, or perhaps he feels so good over the matter that he cannot contain himself and just must tell someone.

Of course, after he lets the story out, it travels fast, and it is likely to grow, like a rolling snowball on a melting day. Bankers,

business men, reporters and politicians all like to repeat such stories to show outsiders what a great community they have.

If growers could realize what harm such stories do them, they would be more conservative. One swallow still makes a summer with many people. Such stories prove to many persons in cities and towns that agriculture is highly prosperous and that all this talk about agriculture being in a bad way is contrary to fact. What use is it to do anything to favor agriculture when farmers are already making such large profits?

Growers who are tempted to tell such stories should pause to consider the facts. Remember that it takes long years of work and lots of expense to grow a fruit crop. Remember that a large part, if not all, of the returns from one good crop is required to meet the production expenses of past years. Remember that we have exceptionally good paying crops only rarely and that they are often the result of peculiar combinations of weather, location, market conditions, etc.—in other words, the result of good luck to a large extent.

Our farm organizations and leaders who are trying to create a better understanding of agriculture on the part of the general public, and who are trying to secure equality for agriculture in our legislature halls, are given greater obstacles to overcome when growers tell such stories of large returns. The chances of securing the desired results are made more remote by the spread of such stories.

Let us all be extremely careful about the stories we tell. Let us consider all the facts before we speak. It is better, as a rule, to enjoy the results of such good luck within the circle of the family. Let us so conduct ourselves that the general public will get impressions of horticulture and agriculture which are in accord with the facts.

Complete the Job

SOME agricultural organizations which have been promoting co-operative marketing in new territory have made the mistake of assuming that the principal work is done when the membership is signed up. This is not the case. The job is only well started when the membership is signed up.

The real task comes after a co-operative is organized. During the organization period the proposition can be put across by enthusiastic speeches, by promises, by charges of manipulation on the part of opposing interests, by appeals to prejudice, etc. But after organization the machine must be gotten into smooth operation so that it can produce results. And results in the eyes of farmers and fruit growers mean dollars and cents for their products. It takes hard work and the best kind of management to put an organization into successful operation after it has been organized.

Organizations and individuals who are promoting co-operative marketing would do well to bear this point firmly in mind. They should plan not only to organize a co-operative, but they should expect to stay with it and help it until it has been made a business success. Even after that time they will find it advantageous to maintain a fairly close relationship so that obstacles can be met and overcome before they become serious. It is better to take steps to avoid troubles before serious damage has been done than to try to correct the damage after it has occurred. A large part of the failures in co-operative marketing are due to the fact that their promoters have left the co-operatives as soon as they were established. It is positively dangerous for any organization or individual to promote co-operative marketing without taking steps to insure the success of the association after it is organized.

Rambles of a Horticulturist

By C. E. Durst

BALDWIN COUNTY, Alabama, is a county worth visiting. I saw many interesting things on my trip to the southeastern states, but no locality impressed me more favorably than Baldwin county. This county is located in southern Alabama between Mobile Bay on the west and the western boundary of Florida (separated by the Perdido River) on the east. Mobile is located just across the bay to the west, and Pensacola, Fla., is just a short distance over the state line to the southeast. On the south the county touches the Gulf of Mexico. The main line of the Louisville and Nashville railroad cuts across the county at the north end after rounding Mobile Bay, and a branch line extends from this (at Bay Minette, the county seat) southward through the center of the county almost to the gulf. It is this branch that carries practically all of the fruits and vegetables out of Baldwin county.

I spent three days in this interesting county. Dr. and Mrs. O. F. E. Winberg entertained me at their delightful home at Silverhill and did everything they could to make the visit pleasant and valuable. Dr. Winberg is leader of leaders in the Baldwin county fruit industry, and he also exerts a large influence throughout the Gulf Coast region. He and Mrs. Winberg established themselves in the county about 20 years ago. Not only have they witnessed the development of the industry, but they have been important factors in the movement.

A Case of Good Management

Dr. Winberg has extensive holdings in Satsuma orchards and pecan groves. How he can manage his scattered properties as effectively as he does is a matter of interest. His groves and orchards are in a remarkable condition, considering that he must depend so much upon hired help and that he can visit each job only at intervals. According to his own statement, however, he keeps in close touch with his men by telephone, and this, together with personal visits made as frequently as possible, enables him to handle the situation satisfactorily.

Having had considerable technical training, Dr. Winberg understands the principles of chemistry, botany, etc., and can apply these in practical fruit growing. Growers in the territory consult him freely on matters of culture. After the freeze of January, 1924, he was literally besieged by telephone far into the night by growers who were seeking advice as to what they should do. Dr. Winberg is also president of the Gulf Coast Horticultural Society, and he is president and general manager of the Gulf Coast Citrus Exchange. He co-operates freely with the government and state authorities, and his home is headquarters for these men when they are in the vicinity. A government weather station is located in his back yard.

Dr. Winberg spent considerable time showing me around, as did also Dr. R. Van Idertine who, as Agricultural Adviser for the Gulf Coast Citrus Exchange, spends his entire time working among the members and in helping them with their problems.

A considerable part of Baldwin county is covered by pine forests and cut-over lands. The agricultural land is scattered about between the forests, the areas varying in size accord-

ing to location. Near the railroads it is pretty well cleared.

Baldwin County Has Good Soil

The outstanding feature of Baldwin county is its soil. The county is gently rolling for the most part, although some areas are rather flat. The soil is a medium sandy loam that is fairly deep and which has considerable body.

for the production of early vegetables and small fruits. Only lower Florida, Texas and California can send these products to the markets earlier.

Satsuma Orange Occupies First Place

From a fruit growing standpoint, the Satsuma orange occupies first position. This fruit was introduced from Japan and planted in Mobile county

proceeding with vigor in planting more Satsumas. The industry ought to be in as good condition as ever in a few years.

Well Sprayed Trees Suffer Least from Freeze

The growers who gave their orchards good spraying and fertilization before the freeze are making handsome profits now. The decreased output of Satsumas, along with the shortage of citrus fruits in Florida this winter, is causing Satsumas to sell at fancy prices. Furthermore, most of the older trees were loaded with fruit this year. Growers who carried their groves through the freeze do not begrudge the care they gave their trees.

Most of the Satsuma groves are planted on fairly new land. Clearing costs about \$15 an acre. The best growers plant legumes for a year before setting the trees. Trees then start faster and make up for the year's time. In the early planted orchards, many trees were set too close. The better growers are now planting the trees 25 by 25 feet. Many growers propagate their own trees, but there are a number of good nurseries in the section.

Two varieties of Satsumas are used, the Owari and the Ikeda. The former is grown more extensively; its fruit ripens about two weeks earlier than that of the Ikeda, and its skin is thinner.

In propagating Satsuma trees, *Citrus trifoliata* seedlings are used for stocks. This stock is the hardest of the citrus family. Fruit grown on it does not wither as quickly as that on other stocks, it colors uniformly when ripe, and it holds well after picking. This stock requires moisture for its best growth, and it is not adapted for high, dry land.

Cultural Methods for Satsumas

Satsuma trees are set out during the dormant season between December 15 and March 1. They can also be planted during the rainy season in July, but few growers plant at this time. The growers use great care in preparing the land thoroughly. Trees are set about the same depth they grew in the nursery, and the buds are kept above the ground. After the hole is partly filled, water is applied and the remaining earth is then filled in.

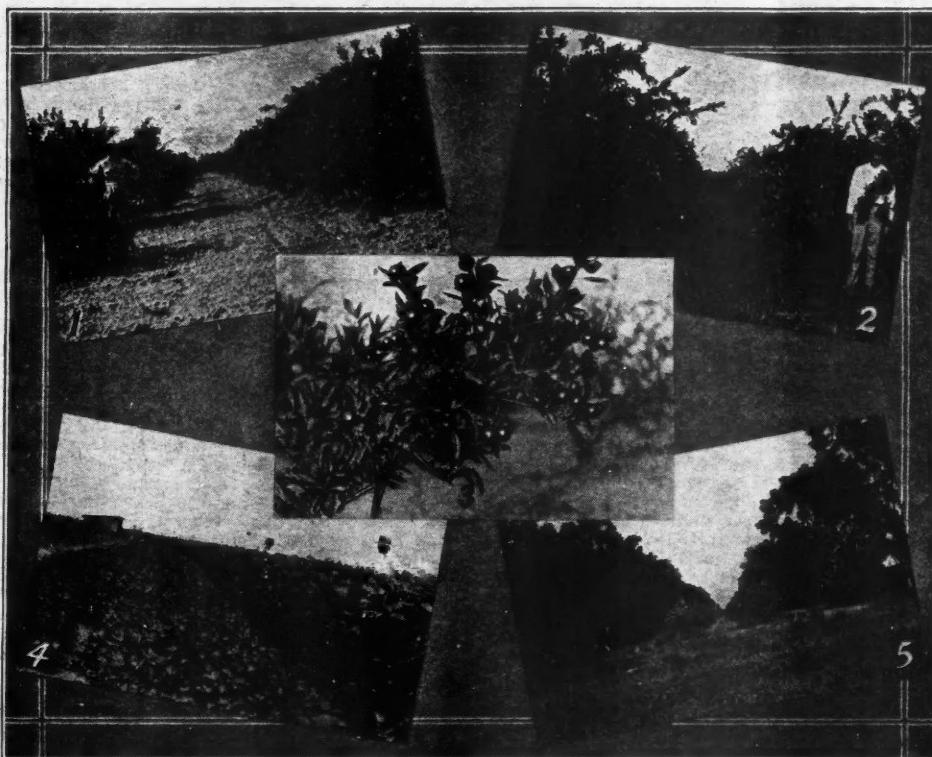
For the first four or five years cultivated vegetables are commonly grown in Satsuma orchards. Clean cultivation is practiced until the rainy season starts, and grass is then allowed to grow or a cover crop is planted. Springtooth harrows, disks and Acme harrows are used.

The freeze of 1924 showed the advantage of banking trees with earth while young. The trees are headed just above the ground. Earth banked around the trunk and over the lower parts of the branches protects the rootstock and buds of the tree. If the top freezes off, new sprouts grow from the branches beneath the covering and a new top soon results. The earth must be removed in the spring. Thousands of trees have been renewed in this way.

Great Interest in Grape Growing

There is great interest in the grape industry in Baldwin county; in fact, this was the chief topic discussed at the meeting of the Gulf Coast Horticultural Society which I attended with

(Continued on page 19)



1—A Satsuma grove grown by H. E. Miller at Loxley, Ala. The trees are 15 years old and withstood the freeze of January, 1924, because of the excellent care they received. They bore a fine crop the present season and, with good prices prevailing, Mr. Miller was well repaid for the extra care and expense. (Mr. Miller standing.) 2—Satsuma grove of Mr. Frampton at Loxley. These trees also survived the freeze and bore a handsome crop the present season. (Dr. Van Idertine standing.) 3—On about four feet of growth at its tips, this branch bore 55 oranges. (Grove of Mr. Frampton.) 4—Soybeans grown following a crop of early potatoes by Spalding Peck at Robertsdale, Ala. It is unnecessary to apply lime to grow soybeans in Baldwin county. (Photographed in August.) 5—An orange grove which was interplanted with pecans by R. J. Ellison, Loxley, Ala. The pecans were planted 60 by 60 feet.

In some other sections of the South, the land is so sandy that fertilizers must be added for every pound of product grown, and it would be time wasted to try to build up the organic matter and general fertility to any appreciable extent, but it is not so in Baldwin county. The land has sufficient body so that it can be built up and maintained at a fairly high state. Of course, when two or three crops are removed in a season, fertilizers must be applied annually.

One remarkable thing about Baldwin county soil is that it will grow legumes. I saw soybeans and velvet beans planted after early potatoes or cucumbers had been harvested that were four to five feet high in August. It is unnecessary to apply lime before planting these legumes. Any soil that will grow legumes like that offers a lot of encouragement.

The long season of Baldwin county is another advantage. The growing season starts in February and continues until November or December. It is not uncommon to grow two and three crops a season. I saw corn in the ear in early August that was good for 60 to 75 bushels per acre, which was planted after a crop of cucumbers or potatoes had been removed. It is quite common to grow two money crops and to follow with legumes. If one crop fails, it is no problem to find another that will fit the season, since a wide variety of plants grows successfully in that southern climate. Baldwin county is admirably located

as a curiosity in 1869. The first commercial plantings were made in 1909. The acreage increased rapidly until 1923, when there were about 18,000 acres under cultivation. A crop of 700 cars was produced that season. At that time everything looked lovely for the Satsuma industry. The trees grew well and produced abundantly. Co-operative marketing was developing nicely, and the Satsuma was making a good impression on the markets. Naturally, growers were optimistic. And then the big freeze of January, 1924, came, the worst in 25 years. This freeze wholly or partly destroyed a great many orchards, and it cut the acreage nearly in half, but it taught a valuable lesson. Orchards which had been fertilized and sprayed survived the freeze best; in fact, hundreds of trees in such orchards came through with practically no damage. On the other hand, the poorly cared for orchards suffered badly. In numerous cases the tops of trees were frozen off, and many are now developing new tops.

Naturally, the conditions were discouraging. Some growers immediately concluded that Satsuma growing was too hazardous and resolved that they would never try it again, but it soon became apparent that well-cared-for trees came through the freeze very well. A good growing season followed and the winter of 1924-25 was quite favorable. The more progressive growers feel sure that a freeze like that of 1924 will probably not come again for many years, and they are

Pruning the Bramble Fruits

By R. E. Loree

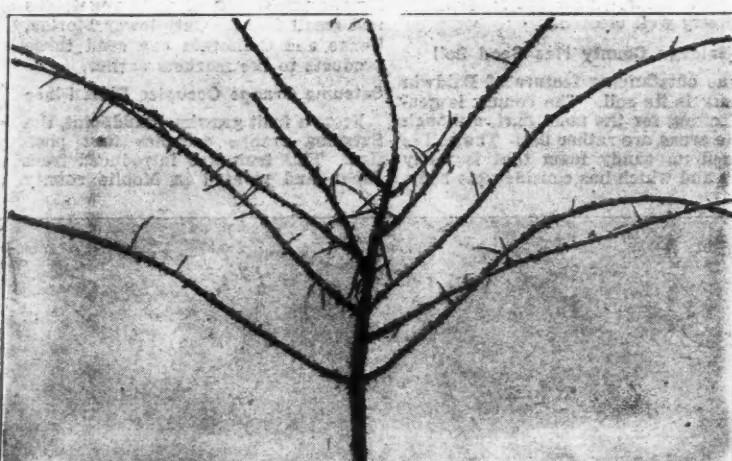
Michigan State College

SUCCESS in growing the bramble fruits depends to a large extent on the attention given to pruning. Tree fruits often bear satisfactory crops for many years, with little or no pruning, but with the bramble fruits regular and careful pruning is essential if the plantation is to be maintained in a profitable condition.

Methods of pruning the brambles vary considerably according to the type of the variety, the vigor and manner of growth, the system of training, and the preference of the grower. However, the fruiting habit of most all brambles is essentially the same, and there are certain general principles which may guide the grower in his pruning operations.

Object of Pruning is to Increase Profits

Primarily the object of any commercial fruit growing enterprise is to secure the greatest profit or net return per unit area. This means the production of maximum crops of high-grade marketable fruit at the lowest possible cost. In order to produce maximum crops of fruit of a grade that will bring the highest market prices, the size and the number of the individual fruits must be considered. With the brambles, the total number of fruits will depend on the number of berries per cane, the number of canes per hill, the number of hills per row, and the number of rows per acre; and the total yield, as well as the grade of fruit, will depend on the average size of all the fruits produced. The individual cane is, therefore, the unit of production in the bramble plantation; and since we are interested primarily in the yield and the grade of fruit, we should inquire into the nature of the factors which influence the number and size of berries each cane will produce, and to what extent these may be modified by pruning.



Early summer pinching of black raspberry shoots is necessary for the development of strong laterals. The pinching back should be done as soon as the young shoots are two feet high.

The number of fruits which each cane is capable of producing, and to some extent the size of berry, will depend largely upon the size of the cane. For instance, Johnston (Michigan Special Bulletin No. 143) in 1923 found that the average yield of black raspberry canes which had been winter pruned in various ways was almost directly proportional to their diameters. Those slightly less than one-half inch in diameter yielded 6.58 ounces and the berries averaged 33.3 to the ounce, while those two-thirds of an inch in diameter yielded 12.47 ounces and only 25.6 berries were required to make an ounce. In other words, a

difference in diameter between one-half and two-thirds of an inch was associated with nearly a 100 per cent difference in yield and with a difference in the average size of berry from 33 to 26 to the ounce. Equally true is the fact that the highest total yields are secured from those canes which produce the largest and leafiest shoots, indicating that vegetative vigor is an important factor in fruit production. Size and vigor of cane is, therefore, an important factor in production, not only in the black raspberry but undoubtedly with all of the bramble fruits. Generally speaking, other things being equal, the

larger the size of the cane the larger will be the total yield and the better the grade of fruit. Hence, a maximum cane-development is necessary for the production of maximum crops.

Pruning Influences Productivity

Obviously, the vegetative vigor and the size of the canes will depend largely on the individual plant, the soil, and the attention given to culture; and the importance of any measures which will tend to promote a vigorous growth at all times should not be overlooked. Nevertheless, there are certain pruning practices which may influence the development of the canes and, therefore, their capacity for fruit production.

With most bramble fruits the canes bear fruit but once. Each season new shoots grow up from the crown of the plant or from adventitious buds on the roots. These shoots develop into canes which blossom and bear fruit the second year and then gradually die. The objects of pruning are to remove the old canes which are of no further use in the plantation and to secure by thinning and heading-in a proper number of vigorous canes for the production of fruit the following year. Pruning in the brambles, therefore, consists of (1) the removal of old canes; (2) summer pruning or heading-in of young shoots; and (3) winter or spring pruning, which consists of thinning the canes and heading-in those which are intended for fruit production.

The first pruning is done when the plants are set in the field. At this time all but a few inches of the tops should be cut off, or perhaps the old cane entirely removed from the young plant. Long canes are sometimes left with the idea of harvesting some fruit the first season, but this is a serious mistake, for any fruit which is obtained the first year is likely to

(Continued on page 18.)

How to Hasten Bearing in Apples

By R. H. Roberts

University of Wisconsin

IN THE last number of the AMERICAN FRUIT GROWER MAGAZINE we pointed out the growth conditions necessary for fruiting and how these were related to the food supply of the tree. We now have to consider how the cultural practices can be used to secure the type of growth needed for bearing. It was previously explained that it is undesirable to check the growth of the tree to get it to bear if any other practicable means is successful. The question to be answered is, then, how to get strongly growing trees into bearing. It was concluded that poor light conditions are frequently the cause of delayed cropping. The particular practices to be discussed will consequently be training or pruning, that is, pruning for form and fruiting.

Tree Form Influences Early Bearing

The necessity for paying attention to the tree form is due to the influence which form has upon early bearing. This is particularly due to two conditions. Trees with flat, spreading tops have much better light conditions than trees with tall, dense tops, and they also have more uniform terminal growth. The result is better diameter of growth and earlier bearing. Tall, upright growing trees have very unequal growth of the different branches. The top ones make a strong growth and the lower ones a short growth. Both are slender, especially as the lower branches are usually badly shaded. The early bearing tendencies of a spreading tree are sufficient reason to justify some systematic attention to developing a desirable form of tree even if it were not also true that such a tree fruits better in later years.

The writer's viewpoint is that the difference in form of trees of a single variety is principally due to the number and distribution of branches along the tree head and not to inherent

differences in the trees. The details of securing the better type of tree have been described in Wisconsin Experiment Station Bulletin 317. This is the modified leader tree. By that we mean neither the so-called double-decker tree nor the tree with the center cut out at a later time. Instead, we have in mind a tree whose main branches are distributed over a four to five foot head and in which the several branches are of equal diameter and will consequently make equal growth in length and have equal chances to form blossom buds and develop uniform fruits.

How Can Delayed Bearing Be Prevented?

The present question is, then, "How can the necessary training be given the tree without delaying bearing?" This leads directly to the question of how pruning affects growth and fruiting. Cutting increases the length of the annual growth. This should not be confused with the frequently repeated statement that "pruning dwarfs a young tree." By this is

meant that a pruned tree which is not bearing will be smaller at a given age, as six to seven years, than an unpruned tree; that is, the total size of the pruned tree will be less in spite of the fact that the average length of the growth is greater. The increase in growth is not enough to equal that cut off plus the growth of the unpruned tree. Now, the shorter average growth of the unpruned tree has a greater diameter and consequently reaches the bud forming condition sooner. This is, of course, in case the two trees have the same openness.

Open, pruned trees will bear earlier than dense, unpruned trees. As a rule, the unpruned tree has a more open top than the tip pruned tree; in fact, it appears probable that this condition is the principal one in the slower bearing of the pruned tree. This is particularly true because of the effect of tipping upon type of growth (Figure 1). The slender growth following tipping is characteristic of the non-bearing condition.

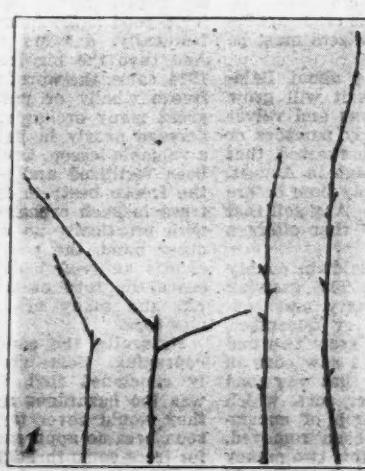


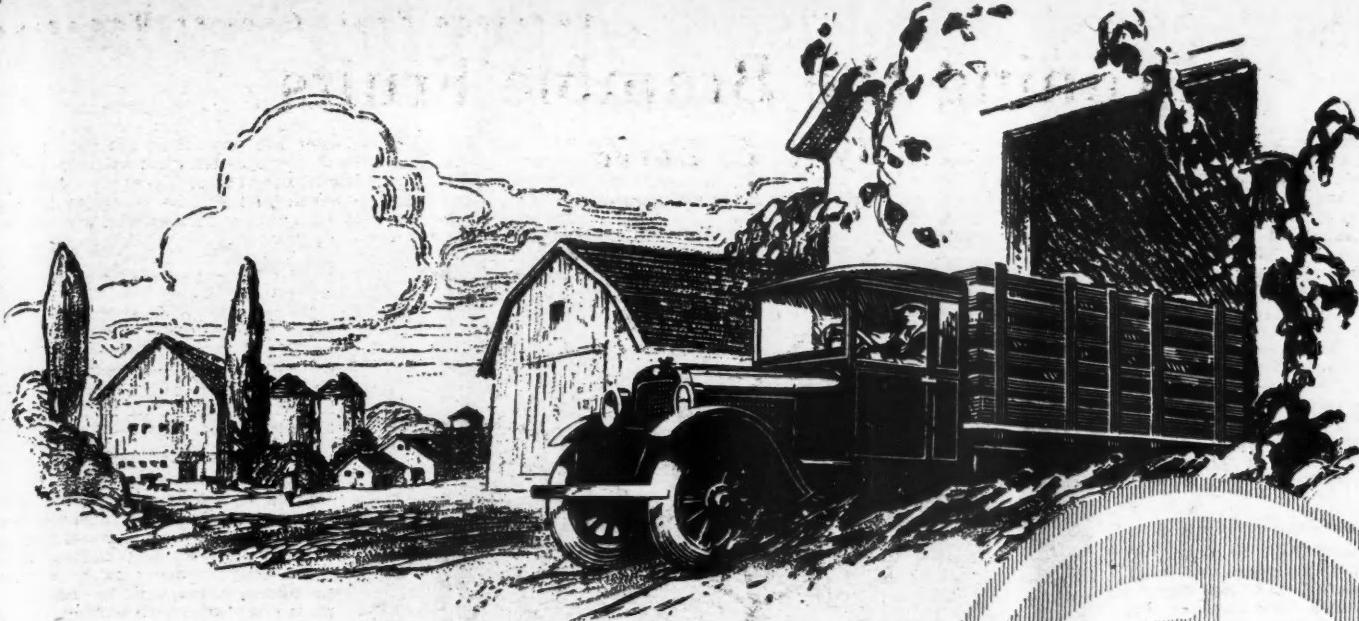
Figure 1—Tipping the branches, as shown on the left, results in the production of slender growths. Untipped branches, as shown on the right, make a plumper growth. (McIntosh.)

Thinning the Top

On the other hand, pruning which thins out the top without doing tipping will hasten bearing, especially with densely growing varieties. In this connection the practice of cutting back small crossing branches should be especially mentioned. The smaller branches in the lower part of the tree top are sometimes left and cut back part way. Instead of "inducing bearing," such a practice gives very slender willowy growths which are almost entirely unfruitful (Figure 1). If the pruning is of a type to increase the entrance of light through the top, it tends to hasten bearing. In view of this fact, it is very important that the pruning be done principally in the upper one-third of the top. It is frequently reported that "thinning-out" does not help bearing. This is certainly the case if the cutting is done in the lower part of the tree, but thinning out in the upper part, especially the center of the top, tends to hasten fruiting. Don't neglect the training necessary to produce a type of tree which bears early and long. Do avoid the type of cutting known as tipping which delays early bearing.

Among the special practices which are used to bring young trees into bearing is girdling or banding. Girdling should be used with caution. It is too apt to greatly check the growth of the tree with consequent production of small, inferior fruits. Banding, as with wire, without cutting the bark, is not so likely to injure the tree. Likewise it is less likely to produce blossom bud formation. With trees nearly ready to come into bearing, banding will give striking responses; with trees which are far from a fruiting condition, this practice does not usually give the result desired.

(Continued on page 14.)



"Send One Over"

A solid trainload of 104 Graham Brothers Trucks was shipped recently to six Dodge Brothers Dealers in Florida. Ten days after arrival every truck had been sold—and more were on the way.

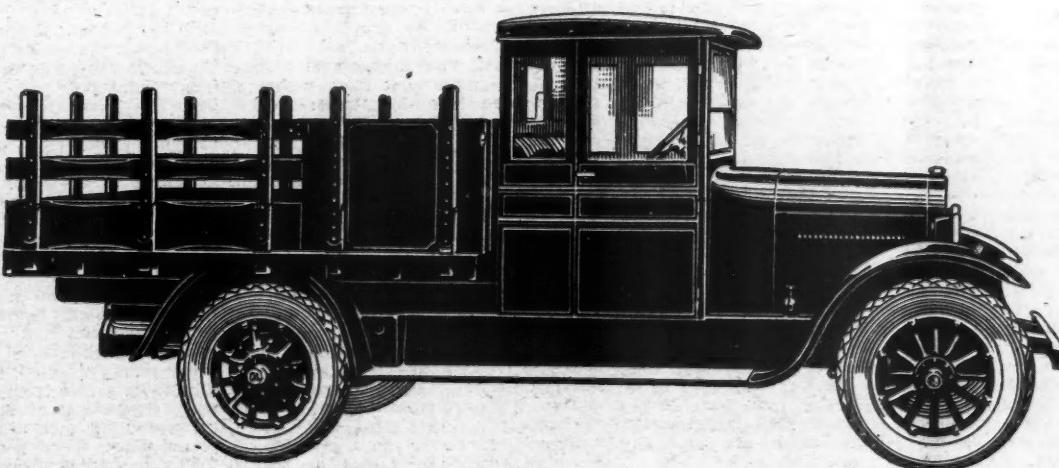
This is an exceptional record—but it illustrates an important point.

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Strawberry Industry of South Florida

By A. W. Roe

TH E COMMERCIAL growing of strawberries in south Florida was started away back in 1889 when a man named John Robinson sent a few quarts of strawberries from Plant City, Fla., to Philadelphia. This fruit appeared on the market at Christmas time. It is said that the berries sold for \$1.25 a quart, that they created quite a sensation, and that from this venture a new industry was born. From that time to the present the industry has made progress yearly. Methods of culture have been carefully studied, and particular attention has been given to handling the fruit so as to produce a quality package. A method of marketing, unique and satisfactory to both growers and buyers, has been evolved at Plant City, the leading berry market of Florida, and one of the largest markets for strawberries in the world.

Industry Is Spreading

The industry has increased and spread to such an extent that, in addition to large acreages belonging to more than 1000 growers at Plant City, strawberries are now produced in commercial quantities at Dover, Durant, Sidney, Turkey Creek, Galloway, Lakeland, Kathleen, Wimauma, and other places in Polk and Hillsborough counties on the west coast. There is also quite a large berry center at Starke, considerably north of the berry growing area named.

Florida strawberries come into bearing in December of each year. It is no uncommon thing for them to be offered in quantities on the markets of the northern and the eastern cities during the Christmas holidays. The largest shipments usually go out in January and February, however. On account of the mild winter climate, the berries mature early and have practically no competition until the berries of Louisiana begin to appear

in March and April. The berry season in Florida is long, continuing from December until May as a usual thing. Peak prices are usually offered for the holiday pickings, and peak movements appear in January and February.

Planting and Cultivation

The Missionary is the variety in common use in Florida, although Klon-

until they are made into shortcakes or consumed in other ways in the faraway cities.

Plants are not set in the spring as in Tennessee and other berry growing districts north of Louisiana and Florida, but they are set in the summer and fall, the heaviest plantings being made in September and October. In Florida, a wide bed is thrown up by



Field scene at Plant City, Fla.

dike is grown to a considerable extent. It is thoroughly acclimated to the local conditions and is a heavy and persistent bearer, producing large, beautiful berries that stand up well

six furrows from a turning plow, and two rows of plants are set on this bed, after which it is "knocked off" with a sweep and packed down with a drag. Some growers prefer a narrower

bed upon which only one row of berries is set. In Tennessee and northern regions, plants for the next season's crop are planted in the spring before they are to fruit the following spring, and they are encouraged to make runners; in fact, the intention is to secure as heavily a matted row of plants as possible. In Florida and Louisiana, the individual hill method is used, the berries being borne only on plants set the fall before.

From crest to crest the double-row berry beds in Florida are about four and one-half feet apart, and plants are set in the double rows, which are from 12 to 16 inches apart. From 10 to 12 inches between plants in the rows are allowed.

Growers Fertilize Heavily

The soil best suited for berries in Florida is a coarse silt loam. It requires rather heavy fertilization. Growers use different commercial mixtures. The amount applied varies widely, some growers using as little as 600 pounds per acre, while others run their total up to 1500 pounds. Usually two applications are made, although sometimes fertilizer is applied three times.

The first application comes soon after the plants have been set in the fall, and contains very little potash but a high percentage of nitrogen, so as to promote the development of a heavy bush and root system. Another application is made when the berries begin to ripen, and it contains a high percentage of potash to aid them in making fruit. In applying the fertilizer, the double-row growers use a hand plow to make a drill between the double rows of plants. The fertilizer is scattered in this drill by hand and then covered with a hand rake. Fertilizer is also applied to the outside sides of the rows by barring them off. (Continued on page 36.)

Propagation of Fruit Plants

Part III—Propagation of Small Fruits

By W. H. Alderman

University of Minnesota

WITH a few rare exceptions, all of the so-called small fruits are propagated without making use of grafting and budding. Various forms of layering and cutting serve to propagate nearly all kinds which do not normally increase in a more natural manner through the medium of suckers or runners. It would perhaps be well to remind the reader that the purpose of these articles is to furnish information to the fruit growers rather than to nurserymen. While most of the methods described are those in general use among commercial nurseries, some will be mentioned solely because of their practical utility to the fruit grower who wishes to reproduce a comparatively small number of plants with an easy and sure method.

Winter Storage of Plants

In the northern states it is almost necessary for those who grow plants for sale to dig their stock in the fall and store it in a cellar or in a properly made "heel" to have it available for early spring delivery. Any cellar which may be maintained at a low temperature and which is not too dry may be utilized. If the cellar freezes slightly during the winter, the plants may be carried in it safely, providing the roots are packed in moist sand or well rotted sawdust. If it can be kept just above the freezing temperature, the plants may be piled in almost like cordwood, with the roots projecting outward from the pile. These roots are usually protected from drying out by packing shingle tow, excelsior or similar material about them. They are moistened from time to time to prevent drying.

If no cellar is available, nursery stock may be kept out-of-doors in a "heel" quite successfully. A shallow trench is dug into which the roots of the nursery stock are placed, with mellow soil packed firmly through and

about them. The plants are put in the trench so that the tops lean nearly to the level of the ground. Just before freezing weather begins, the entire top of the plant should be covered with soil to a depth of about two inches. The entire "heel" is then covered with straw or cornstalks to prevent too deep and severe freezing. It is desirable to place this "heel" on a well drained southern exposure to insure early thawing in the spring, thereby enabling the grower to remove his plants in time for early delivery. In some cases, particularly in the more southern locations, the process would be reversed and a northern exposure selected in order to hold the plants dormant for a longer period of time.

Red Raspberries

This popular and cosmopolitan fruit is widely grown and easily propagated by either farmer or nurseryman. It propagates naturally from suckers thrown up from the roots and usually sends out so many of these new plants that the fruit grower is put to considerable expense in weeding and cultivation in order to restrict his plant rows. There is no difficulty whatever in increasing a planting from 10 to 20-fold in two years' time by utilizing the sucker plants which are naturally formed.

The common method of handling red raspberries where plants, as well as fruit, are desired is to grow a wide matted row in which the original plants are set four feet apart with rows six feet apart. At the end of the first season, a considerable number of new sucker plants will have formed, in some cases enough to complete the

row. With very vigorously growing plants, it is sometimes possible to dig a considerable number of new plants at the end of the first year, but ordinarily, plants are not dug until after two seasons of growth. At that time it is possible to secure from 20,000 to 50,000 No. 1 and No. 2 plants per acre, depending on how much restriction has been exercised in the spread of the rows. A No. 1 sucker plant should be about one-fourth inch in diameter and should have either an "L" or a "T" shaped root. This means that a portion of the main root from which a sucker arose should be attached to the sucker plant. The common practice among nurserymen is to dig these plants in the fall, separate them into grades and tie in bundles of 50 each. After the bundles have been tied, the tops are generally cut back to about 18 or 20 inches in length. They may then be stored in a cellar until spring. The fall digging should not take place until the canes have ripened and the lower leaves have started to drop. In northern states it is usually impossible to delay digging until all the leaves have dropped because of the early freezing of the ground. This makes a considerable task of leaf stripping.

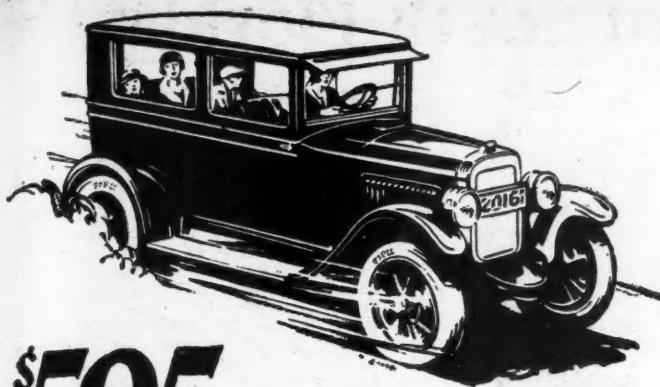
Some nurseries make a practice of growing what are known as transplants. These are usually No. 2 sucker plants which are lined out in a nursery row in the spring and allowed to grow for an extra season. Such plants when dug are large, strong growing individuals, containing two or more canes and a well developed root system. They will produce a fair crop the first year and should be planted with the

canes cut back to not less than two feet in length. These plants, because of the expense involved, are not as generally used as are the one-year sucker plants which, after all, are thoroughly satisfactory and are much easier to pack, ship and plant.

Mosaic Disease

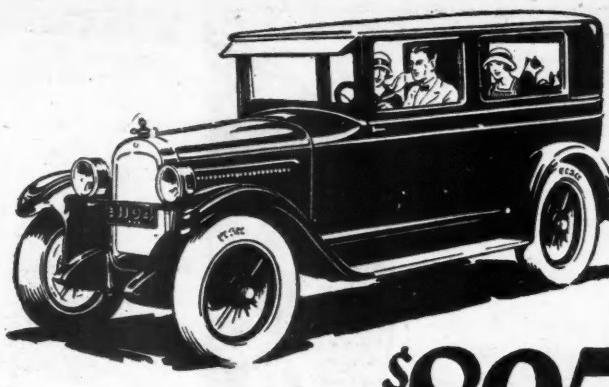
Raspberry growers have within the last few years become acquainted with a serious disease known as mosaic. This is one of the so-called virus diseases which is carried in the sap of the plant and is spread from plant to plant by means of sap-sucking insects, the principal offender being a large green aphid or plant louse. This disease has become so serious in most of the raspberry growing states that drastic efforts are being taken by nursery inspection forces to hold it under control. It reduces the vigor of the plant, and consequently the yield. The fruit is smaller and more crumbly on mosaic plants than on healthy plants. So sweeping in its effect has been the mosaic disease that in some states entire varieties have been discarded because of the prevalence of infection. Nurserymen and fruit growers cannot be urged too much to make every effort to secure and maintain disease-free plantations. If mosaic-free plants can be secured and planted in beds isolated by at least 20 rods from any other raspberry field, they can generally be kept free from the disease. It will require watchfulness and immediate digging and destruction of infected plants whenever they appear.

The disease condition is denoted (1) by a yellowish-green mottling which appears upon the leaves; (2) by a reduction in vigor of the plant; and (3) by a general sickly appearance. Since there are other diseases which have somewhat similar symptoms, it is difficult to describe the mosaic disease so as to make it possible for the (Continued on page 14.)



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Wisconsin Society Approves Five Varieties

FREDERICK R. CRANEFIELD, Secretary of the Wisconsin State Horticultural Society, reports a successful meeting of the society at Eau Claire on November 18-20. Heretofore the annual meetings have been held regularly at Madison. The change in location has met with such success that the practice will be repeated in the future.

A full half day was given to a discussion of raspberry mosaic, which has become a serious factor in the culture of raspberries. Dr. R. B. Wilcox of the United States Department of Agriculture, one of the best experts on raspberry mosaic in the United States, gave an address on the subject and led the discussion which followed. P. A. Glenn, state nursery inspector of Illinois, discussed inspection problems and stated that mosaic had not become a serious factor in Illinois thus far. S. B. Thacker, state nursery inspector of Wisconsin, stated that no severe measures would be undertaken at once with reference to eradication of mosaic.

The society discussed the variety question and went on record as favor-

ing the following for planting in Wisconsin: Wealthy, Fameuse, McIntosh, Northwestern Greening and Wolf River.

W. A. Tool of Baraboo was elected President; J. E. Leverich of Sparta, Vice-President, and Frederic R. Cranefield of Madison, Secretary-Treasurer.

New Jersey Station Develops New Varieties of Early Peaches

THE NEW JERSEY Agricultural Experiment Station has been working for 10 years on the development of early varieties of peaches superior to the Carman, Champion, Hiley and Mountain Rose. It is now claimed that several varieties have been developed which are superior to those named and which cover the marketing season more effectively up to the time Elbertas begin to mature.

The Pioneer was introduced in 1923 and is already well known. It is the result of a cross between Belle and Greensboro and is a large, oval, white-fleshed, almost freestone peach of good quality, ripening nearly a week before Carman.

Cumberland is another seedling of the same cross, named in 1924. The fruit is large, oval in shape, white-fleshed and usually a freestone. It ripens at the same time as Pioneer and it may finally replace that variety.

Radiance, named in 1925, is another Belle-Greensboro seedling, which ripens at the same season as Carman. It is recommended for planting in place of that variety. It is a true freestone, large in size, oval in shape, white-fleshed and well colored.

Eclipse, the next variety to ripen, was offered the growers in 1924. It is a self-pollinated seedling of Belle, yellow-fleshed, freestone and ripens at the same time as Hiley. The fruit becomes orange-yellow in color, covered with red, and it hangs to the tree well. The quality is very good and the fruit averages larger than that of Hiley.

Primrose, another seedling and a cross between Belle and Elberta, is expected to supersede the Belle. It is a large, yellow-fleshed freestone, ripening several days before Belle and much superior to it in size and color. The experiment station is distributing a limited number of trees to New Jersey growers. The stock has been placed in the hands of several nurserymen and trees will no doubt be

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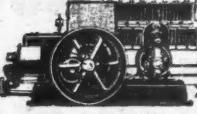
120 gal. per hour capacity pump, 60 cycle motor, 1 gal. galv'd tank complete \$84.75
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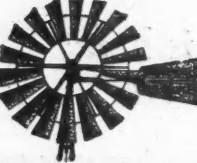
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Annual Meeting of Michigan Horticulturists

THE MICHIGAN State Horticultural Society held another of its fine annual meetings at Grand Rapids, December 13. The conspicuous thing about the Michigan society is that there are so many prominent growers who are active in the society work. In some societies a few growers dominate the proceedings, but this is not the case in Michigan. There are so many growers who are active that none of them stands out conspicuously. This is as it should be.

George Friday, popular president of the society, gave an opening address on the fruit situation in Michigan. The canning crops question, an important one in the state, was handled by M. C. Hutchinson. Frame C. Brown of Worthington, Ohio, described his methods of marketing fruits on the roadside. He sells the products from 98 acres in his roadside market, and 90 per cent of the sales are made on Sundays. In a second talk, Mr. Brown stated that orchard heating had proved unadapted for his conditions. F. L. Granger, Manager of the Michigan Fruit Growers, Inc., gave an interesting talk on marketing. He emphasized in particular that the number of varieties should be greatly reduced.

H. D. Hootman, Secretary of the society, in a talk on "What Happens in the Dark," analyzed the returns from a bushel of apples and illustrated with real apples the parts of a bushel required to meet the returns received by the retailer, the wholesaler, the railroads, the growers, etc., when a certain price level prevailed. He showed that only fairly high prices are capable of returning a profit to growers. He concluded that growers should emphasize the production of high quality fruit.

M. J. Dorsey of Illinois discussed pollination and the setting of fruit, and C. E. Durst, of the AMERICAN FRUIT GROWER MAGAZINE, talked on the merchandising and advertising of fruits. Several other subjects were covered by competent speakers.

The meeting was attended by about 400 growers. There was an excellent exhibit of material, equipment and fruit.

The following officers were re-elected as follows: President, George Friday, Coloma; Vice-President, H. S. Newton, Hart; Treasurer, J. Pomeroy Munson, Grand Rapids; Secretary, H. D. Hootman, East Lansing.

Interesting Exhibit of Apples

APPLES from China, Siberia and other remote places were a feature of the exhibit of the New York State Experiment Station at the Syracuse State Fair. The fruit was taken from specimen trees growing on the station grounds at Geneva. Several species of apples were represented, some of which have played an important part in the improvement of our commercial varieties through inter-breeding. Many of these wild apples are no larger than a good-sized pea, although in other respects they are perfect apples. They presented a marked contrast when placed alongside the highly developed varieties of today.

Several species of wild pears were also shown, as well as other novelties in the fruit line, including nectarines, elderberries, etc.

The exhibit also demonstrated the methods employed by fruit breeders in creating new varieties. Some of the new varieties developed by the station were also exhibited.

AMERICAN FRUIT GROWER MAGAZINE: I wish to commend you on your departments "With the Co-ops" and "Markets and Marketing," and also on "Rambles of a Horticulturist." —Ralph Sundquist, Washington.

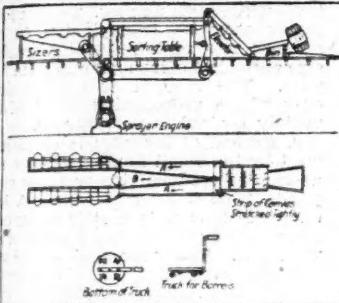
Ohioans Build Apple Packing House from Junk

By C. F. Christian

APPLE growers of Little Hocking, Ohio, wanted a co-operative packing house. They were long on ambition but short on funds. H. P. Curtis told the Ohio Horticultural Society at last winter's meeting in Columbus how he and his neighbors equipped a packing house that handles 265 barrels of fruit a day from the junk piles on their farms and \$475 in cash.

"I found the ways and means committee perched on an old grain binder in my barnyard one evening when I came home from town," said Mr. Curtis. "They had figured out a way to equip our packing house with parts from my wornout grain binder and a discarded husker and shredder."

"When we gathered our supplies in an old flour mill we had two Ballou sifters that cost \$360—the most expensive part of our outfit—a gas engine from a power sprayer owned by one of our men, two canvases and the platform rollers from my grain binder, the fodder elevator from the husker, and some lumber. Twelve days of labor



Diagrams showing construction of homemade fruit grading machine and truck for barrels

donated by farmers made a packing house out of this mixture.

"The bin near the unloading platform where our apples are dumped from barrels is raised 20 inches from the floor at one end and slopes down to the floor level next to the elevator. The bin is padded. The slope of the bin feeds the fruit down to the elevator, but we found it necessary to put a woman at the elevator to see that the padded slats and pockets in the elevator are properly loaded.

"The wooden bottom of the fodder elevator was removed and a strip of canvas as wide as the elevator was passed over the cleats and tacked fast at the bottom of each cleat. This formed a pocket between the cleats for the apples. The canvas pockets of the elevator come up under the end of the bin and lift the apples to the sorting table.

"We built a frame of two by fours 10 feet long and as wide as the binder canvases, with the platform rollers at each end. Two platform canvases, with cleats removed and strapped together, carry the apples past the sorters. A 'V'-shaped partition extends from the lower to the upper end of the sorting table. The apex of this 'V' is at the end of the table where the apples drop from the elevator. The B-grade fruit is put inside of the partition and two streams of A-grade fruit move down to the sifters.

"Our engine sets under the floor, and a belt running through a slot in the floor drives the sifters. The sorting table and the elevator are driven by a sprocket chain from a counter shaft under the floor.

"Floor space is limited in the packing house and we wanted to move the barrels from the sifters to the press, where heads are put on, without tipping the barrels on the chimneys and rolling them. We built a truck that moves the barrels in an upright position.

"A platform slightly smaller than the head of a barrel rests on four large double-swivel castors. An iron strap bolted across the grain of the platform and extending up two feet, with a handle on the end of the strap,

enables us to move barrels in any direction in an upright position.

"In 1923 we packed 5200 barrels of apples at a labor cost of 25 cents per barrel. Last year we cut that to 24 cents on 3200 barrels."

THE NEW YORK Agricultural Experiment Station, in co-operation with A. B. Stout of the New York Botanical Garden, has been studying the pollination of different fruit crops, especially pears, apples and cherries.

It has been found that the McIntosh, Rhode Island Greening, Delicious, Gravenstein, Red Gravenstein and Cortland are decidedly self-sterile; that is, they will not set fruit when pollinated with their own pollen. It has also been found that certain varieties are not satisfactory cross-

pollinators for other varieties. For instance, McIntosh pollen has been found highly fertile on Cortland, but Cortland pollen is less effective on McIntosh. Wealthy and McIntosh appear to be excellent pollinizers for each other, and these two varieties work very well when interplanted with each other. Baldwin pollen has failed to produce fruit on either the Wealthy or the Rhode Island Greening.

In the case of cherries, Black Tartarian was found to be extremely self-sterile, but it set fruit well when crossed with Windsor pollen. The Bartlett pear failed to set fruit satisfactorily from its own pollen but gave good results when pollinated with pollen from Winter Nellis.

After the studies are completed, the

authorities hope to be able to recommend with reasonable accuracy just what combinations of varieties will work well in commercial plantings. It is evident now that the planting of solid blocks of one variety is a serious blunder, but much of the uncertainty existing will disappear when we have more definite information as to the best pollinators for various sorts.

"Pop, I got in trouble at school today, and it's all your fault."

"How's that, my son?"

"Well, you remember when I asked you how much a million dollars was?"

"Yes, I remember."

"Well, teacher asked me today, and 'helluva lot' isn't the right answer."—*Current Topics*.

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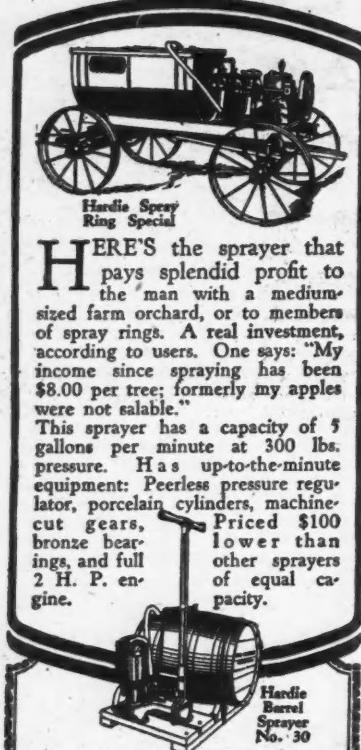
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novice to positively identify it; in fact, it is almost necessary to have the disease pointed out before a beginner can hope to recognize it with any degree of certainty.

Black Raspberries

The black raspberry does not produce sucker plants but is readily propagated by tip layering. Some time after the middle of the summer, new shoots of this fruit will frequently branch toward the tip and produce a growth slightly less thorny than a normal cane, with the leaves somewhat bunched toward the tip. At this time, if these canes are bent until the tips touch the ground and covered lightly with earth, they will readily strike root. By fall a root system will be fairly well developed and the following spring a new rapidly growing and very brittle cane will be produced. Except in northernmost districts, fall planting may be practiced by digging the rooted tip, leaving enough of the old cane attached to serve as a convenient handle to the plant. If spring planting is practiced (this is the normal planting season for northern states), the plants should be dug as early as possible after the frost leaves the ground and before the new tender shoot has been produced. At this stage they may be readily packed and shipped like other nursery plants. For transplanting on the home grounds, it is possible to utilize the plants even after the new shoot has been formed by exercising care in handling.

Black raspberries are difficult to carry over the winter in cellar storage on account of the large mass of fine fibrous roots. If they are fall dug, it is safer to carry them outdoors in a well made heel than to attempt to handle them in the cellar. Even experienced nurserymen frequently suffer a considerable loss in cellar storage.

A word of warning should be issued regarding the mosaic disease of black raspberries. This was discussed under red raspberries, and it is sufficient to point out that the black raspberry is affected by a mosaic fully as destructive as the red raspberry mosaic. Methods of control are similar for mosaic on both kinds.

(Continued from page 10.)

Blackberries

The rampant growing blackberry may be propagated in three ways. The commonly recommended method is to use root cuttings. In this process the plants are dug and the larger roots chopped up into small sections about two to three inches in length. These are planted in a nursery row in the early spring and covered with three or four inches of well worked soil. They strike root very readily, and numerous plants may be secured in this manner. This method is used extensively by commercial nurseries. The plants are usually large enough for transplanting at the end of the first season's growth.

The second method of propagation which is used by many nurseries, and quite commonly by fruit growers, is through the use of sucker plants. Varieties of blackberries vary somewhat in their ability to reproduce by means of suckers, but for the most part they furnish a liberal supply of such plants. These can be handled in exactly the same way as the red raspberry, and for ordinary propagation will be entirely satisfactory.

A third method of propagation sometimes used by the home grower is the more cumbersome process of plant division. An entire clump of blackberry is dug and separated into a number of smaller crowns containing one or more well rooted shoots. Ordinarily, such a clump will produce only a comparatively few new plants, but these are generally of good size and make a vigorous growth.

Grapes

Grapevines are propagated easily by means of straight stem cuttings. The common method of procedure is to prune the vines in the late fall or early winter and from the strong, vigorous one-year-old shoots make cuttings 14 to 16 inches in length. These cuttings usually contain three buds or joints. The lower cut is made close beneath a joint and the upper cut an inch or an inch-and-a-half above a joint. The cuttings are tied in bundles of convenient size, usually 50 to the bundle, and are handled in the method indicated in Part 1 of this

Currants

Currants are propagated in much the same manner as grapes, namely,

(Concluded on page 21.)

How to Hasten Bearing in Apples

(Continued from page 8.)

The Caldwell System

Another practice which is receiving some attention in the east at present is the "Caldwell" system of tying down branches, which is used in some pear orchards in California. Figure 2 shows a young Transparent tree with the branches tied down. The extreme production of suckers with the resulting shade produced, seems to prevent blossom bud formation. This method does not seem to fit this variety. A

modification of this system does, however, seem to be practical. This is the tying down of part of the branches (Figure 3). The tied branches have good but not extreme light conditions. The untied branches also have good light. Thus, suckers are largely avoided, a reasonable tree form is maintained and bud forming conditions may be produced. This practice should not be tried until the trees are of full size and age to bear. Should the tying fail to give buds, a badly

shapen, if not sucker-filled, tree is left to deal with. First, develop a wide, spreading tree and use these emergency measures only when forced to do so.

Thinning Top After Growth Has Started

Another very practical practice can be slow to bear. This is thinning out to be used to handle trees which did not get started in a good form and which

(Concluded on page 17.)

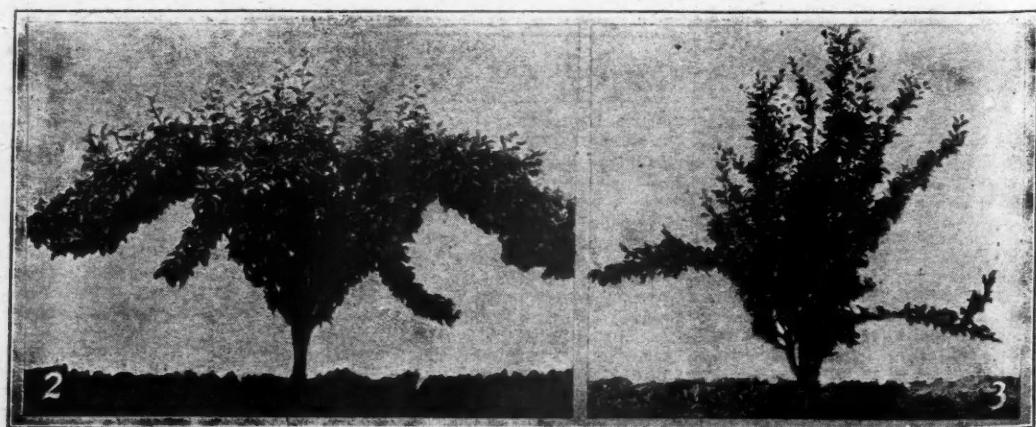


Figure 2.—Tying down all of the branches in this Transparent tree caused many suckers to develop and fruit buds were not produced. An undesirable type of tree is produced. The practice might work with some varieties.

Figure 3.—Tying down some of the branches of dense-growing varieties, such as Transparent, seems to be practicable. Note the openness of top, the good form, and absence of suckering.

Pruning the Bramble Fruits

(Continued from page 8.)

be produced at the expense of the growth and vitality of the plants. Furthermore, plants which are not severely cut back at the time of setting are more inclined to produce side branches from the buds of the old cane, and but few new shoots will be thrown up from the roots. Usually four to six inches of the old cane are left to make the plants easier to handle and to indicate the rows after setting. However, even this much of the old cane may become a source of infection for cane diseases, and anthracnose is almost sure to be carried into the new plantation. For this reason, it is best when setting plants of those varieties which are susceptible to anthracnose to cut away all of the old cane before taking them to the field. Plants pruned in this way and given one thorough spraying later have been found to be apparently free from this disease.

Heading-in and Its Uses

The heading-in or pinching back of new shoots during the growing sea-

the blackberries and the purple raspberries, being more vigorous, are headed somewhat higher. Care should be taken to avoid heading them too high, as this will result in the development of a tall top-heavy plant which will be easily broken or blown over.

Removing the Old Canes

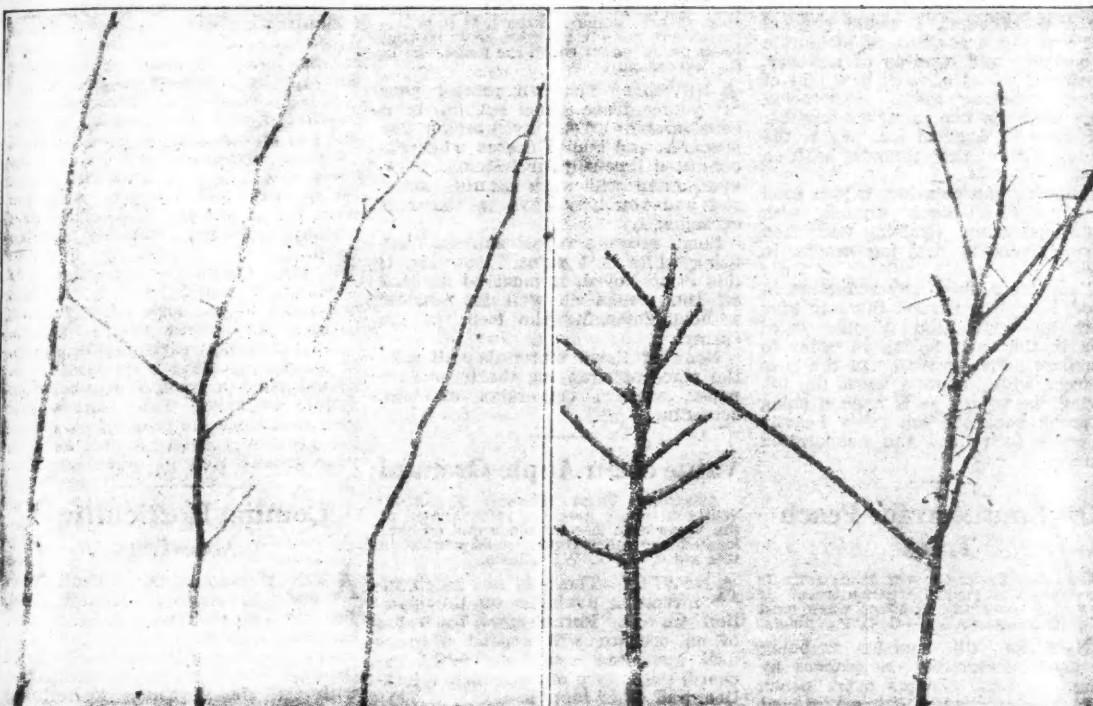
Opinions differ regarding the time that the old canes should be removed. Some growers remove them after harvest while others allow them to remain until the usual time of pruning in the spring. By removing them immediately after harvest, insects and diseases which may be harbored in them can be destroyed, and it is thought that the new shoots, having more room, will make a better growth. There is also an opportunity at this time to thin out the weaker shoots, thus throwing all of the energy of the plant into the development of those which are left. However, recent experiments with the black raspberry indicate that the removal of the old canes immediately after harvest has

the individual canes, but even the most vigorous canes will bear far more fruit buds than are needed for economical fruit production.

The winter or dormant pruning is, therefore, a wholesale fruit-thinning process intended to concentrate the moisture and nutrient supply of the plant in the development of fewer clusters and thus secure fewer berries of larger size and a better grade. This thinning of the fruit may be accomplished by thinning the canes in the hill or row, and by heading-in either the canes or the laterals, or perhaps both, depending on the growth of the variety.

Thinning the Canes

Usually some thinning of the canes will be necessary, particularly if the shoots were not thinned at the time of removing the old canes after harvest. The number to leave in each plant will depend on the vigor of the plant, the fertility and moisture holding capacity of the soil, and the character of growth of the canes. Only



Left.—Red raspberry canes should be headed-in according to their size and vigor. The one on the right is five-sixteenths of an inch in diameter and should not carry over 20 to 25 buds. The one in the center is seven-sixteenths of an inch and the one on the left ten-sixteenths of an inch in diameter—these will carry 30 to 35 buds each and should be lopped back to a height of four to five feet.

Right.—Long and short lateral pruning of the black raspberry compared. Larger total yields and a better grade of fruit will result when the laterals are cut back to four to six buds in length.

son is practiced with the blackberries and the black and the purple raspberries, but it is seldom practiced with the other bramble fruits. A few growers do some summer pinching in the red raspberries, but it is seldom practiced in commercial plantations. The object of summer pinching is to check the upward terminal growth of the shoot and force the lower buds, which otherwise usually remain dormant, to develop strong side branches, thus making it a low, stocky, self-supporting cane. Summer pinching should be done soon after the shoots have reached the desired height. In order to do this, it is necessary to go over the plantation several times as all of the shoots do not attain the proper height at the same time. Weaker laterals will result if the canes are allowed to grow much beyond the desired height and then be severely cut back later. If the work is done at the proper time, the tender tips may easily be pinched off with the thumb and fingers and no shears or knife will be necessary. The height of heading in the shoots varies with the type of bramble and the vigor of the variety. With most varieties of the black raspberry the height should be about two feet, while

very little, if any, influence on the development of the new shoots, and that from the standpoint of support it is better to leave them in until spring. On the other hand, the insect and disease problem is very likely to become serious in the average bramble plantation, and as a control measure against the spread of blight and other cane diseases, it is probably best to remove them soon after harvest.

Winter or Spring Pruning

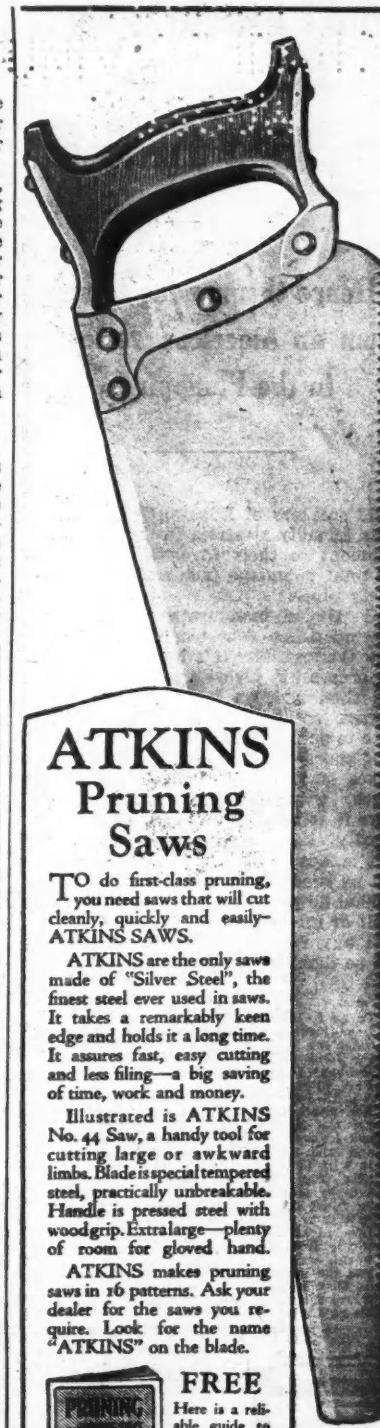
This covers in a general way those pruning practices which may have a more or less direct influence on the development, or on the health and vigor of the canes. We may now consider the most important of all the pruning operations—the winter or spring pruning. The number of fruits a plant will produce if left unpruned is problematical. Ordinarily the bramble fruits produce large numbers of fruit buds which, if allowed to remain and develop fruiting laterals, will produce more berries—many times over—than the plant will be able to ripen properly. As a result, the fruit is likely to be small, seedy and poor in quality. The number of berries a plant is capable of producing depends on the size and vigor of

medium and large canes should be selected for fruiting. With the blackberry and the black and the purple raspberry, four or five canes is the usual number left. Some plants are capable of carrying only two canes, while others are capable of carrying five or perhaps six to good advantage. A larger number of canes per plant may result in the production of a larger number of berries, but these are likely to be much smaller, and the total yield will not be increased. With red raspberries, more canes can be left to the plant due to the fact that they are usually more straight and unbranched. Ordinarily, five to seven canes are left, but with varieties, such as Ranere, which produce a large number of small canes, as many as 10 or 12 may be left in each hill. If the hedge system of training is used, eight to 10 good canes should be sufficient for four feet of row. The canes of the dewberry are seldom thinned, but if there is a large number per plant, some thinning may be advisable.

Amount of Heading-in

The severity of heading-in the canes will depend on their size and

(Concluded on page 19.)



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Dear Sirs:—Enclosed please find money-order for \$4.65, for which please send me the following: 1—16 oz. glass jar Ready Rubbed; 1—\$1.50 can Qboid; 1—\$1.50 can Plug Slice.

Until recently I have been able to get Edgeworth from a dealer near here, but for the last month it has been "out," and I have been smoking native cigarettes and other so-called tobacco. I realize that it will be three months or so before I hear from this, but I know I'll get it sure by sending direct to you, you won't be "just out." In the meantime I may be able to scare up a little here and there. It's mighty hard to "buy" Edgeworth from friends in this part of the world. They'd just about as soon give you the key to their safety deposit boxes as they would to the "Old tobacco box" where they keep their Edgeworth. I don't blame them: it's mighty hard to get, and it's terribly hard to go without. I know how the baby felt about the soap now: I won't be happy till I get my Edgeworth.
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The Editor's Mail Box

Winter Injury to Tree Trunks

AMERICAN FRUIT GROWER MAGAZINE: We had considerable rainy weather the past fall and this wound up with a stiff freeze. The bark on a number of our trees is split, varying from a few inches to about 20 inches in length, and the bark is loose on some trees. Can we do anything to benefit these trees, or will they die?—B. B., Nebraska.

ANSWER: From your description, I think your trouble must be due to winter injury. Such forms of injury develop quite frequently following sudden changes in temperature. The bark and wood on the outside of the trunk freeze while the interior wood remains unfrozen. This condition sets up a stress in the trunk due to the unevenness of the pressure and a crack in the wood and bark results. Such cracks occur more often near the base of the tree than at other places because of the unequal growth near the base, causing unevenness in the stresses.

About the only thing that you can do to such trees is to clean out the wounds and disinfect and paint them. For a disinfectant, I would suggest that you use a solution of bichloride of mercury and cyanide of mercury. Dissolve a tablet of each in a pint of water, avoiding metal receptacles. Then pour the two mixtures together and store in a glass jar. Paint the solution over the wounds with a brush.

Following the painting, it is a good thing to dress such wounds with white lead paint. Grafting wax often serves nicely in dressing cracks in trees.

If the trees show any reduction in vigor, it will be a good thing to give them an application of nitrate of soda in the early spring in order to stimulate active growth. In the case of trees which show a weak top following the injury, it is a good thing to prune back the top fairly heavily in order to reduce the evaporation surface.

Oil-Emulsion for Peach Trees

AMERICAN FRUIT GROWER MAGAZINE: Is oil emulsion all right for peach trees? If so, will it leave any ill effect when used one year after another?—G. C. P., Illinois.

ANSWER: Oil emulsion is being used successfully on peaches by many growers. I saw some peach trees at the government experiment station at Ft. Valley, Ga., the past summer which had been sprayed three successive years with oil emulsions and some of them also received three summer sprays during the past season. None of them showed the effects of injury from oils. Some people have contended that a cumulative injury develops following the use of oils, but the results from these experiments seem to indicate otherwise. Of course, further experimentation may change our position in this matter.

Oil emulsion is fit for use as long as the oil is thoroughly emulsified with the remainder of the material. Many growers have used the material successfully even when the oil has separated out. However, I think it is more or less risky to use the material when it has reached this condition. The best that I can say about using emulsions after a separation has taken place is that you are taking a chance when you use them.

Trespassing Roots

AMERICAN FRUIT GROWER MAGAZINE: My neighbor has some large pepper trees growing near the fence line. The roots invade my land and interfere greatly with the development of my grapefruit trees. What can I do about the matter? When I speak to my neighbor about it he simply advises me to cut the roots.—C. B., California.

ANSWER: I am not familiar with the laws of your state in regard to damage from your neighbor's trees.

However, growers have the right in all states, so far as I know, to cut down at the line and remove the roots on their side of the fence. They can also cut down the branches that are hanging over their land. In some states they cannot take the fruit but must throw the branches and the fruit over onto the neighbor's land.

I realize that it is difficult to cut the roots and that the roots grow out again in a short time. You could prevent the growth of the roots by digging a trench and erecting a concrete wall, but of course this would be expensive.

I would suggest that you write to your Department of Agriculture at Sacramento and ask their opinion.

Protecting Trees From Rabbits

AMERICAN FRUIT GROWER MAGAZINE: Will you kindly advise me what to do with a young orchard four years old consisting of pears and apples. I have been plowing the orchard every fall and practicing clean cultivation all summer.—E. L., Utah.

ANSWER: You can protect your young trees from rabbits to a considerable extent by keeping the branches and trunks coated with concentrated lime-sulphur solution. However, rains will wash off this material and you may have to renew it occasionally.

Some growers report success from using white lead paint. However, if this is employed, it must be scraped off the trunks as well as possible without damaging the trees in the spring.

None of these materials will take the place of wrapping the trees with paper, veneer, cornstalks or wire screening.

Value of an Apple Orchard

AMERICAN FRUIT GROWER MAGAZINE: Will you kindly give me your opinion of the value of a 26-year-old apple orchard located two miles from a good market in this state?—L. T. W., Illinois.

ANSWER: There is not much information available on the question you ask. Furthermore, the value of an orchard will depend a great deal upon the condition of the orchard, the nature of the soil, the location, and other factors.

The Minnesota Experiment Station investigated this problem from the standpoint of Minnesota conditions several years ago. In Bulletin 209, issued in April, 1924, the value of an acre of bearing apple orchard is placed at \$538.57. An allowance of \$510 is made for land valuation, \$18.24 for the necessary spray equipment, and \$10.33 for miscellaneous equipment. It seems to me that these figures are within reason for an apple orchard.

Use of Prunings As Scions

AMERICAN FRUIT GROWER MAGAZINE: I am pruning my trees and would like to know if I can save the cut-off portions and use them as scions for grafting in the spring. Please also advise me how I can safely carry these scions over until spring. Can I keep them in the cellar at about 40 degrees Fahrenheit, or do you think it better to do the grafting now?—J. F. R., New York.

ANSWER: If you want to do top working, you will need to wait until early in the spring, just before growth starts, to do the grafting. If you topwork much earlier than this, a large percentage of the grafts will be lost.

You can take the scions any time during the winter. They should be put immediately into storage. You can keep them successfully in cold storage slightly below the freezing point. There should be sufficient moisture to prevent evaporation. You may be able to keep the material for a month or two at 40 degrees

Fahrenheit, provided you keep the air saturated with moisture in order to prevent evaporation from the scions. Excessive evaporation will kill the material. Be sure to furnish good ventilation so that the scions will not mould. Some propagators store the scions in moist sand, sawdust or moss.

If you want to propagate some new trees, you can do this work any time during the winter. It will be necessary, of course, to obtain the seedling roots before you can start the grafting. The grafts can be made any time during the winter. They should be stored away carefully until early spring. Nurserymen usually bury them in sand in a fairly well protected place. The young grafts are set out in the open as soon as the ground can be easily worked.

Cultivation of a Young Orchard

AMERICAN FRUIT GROWER MAGAZINE: Will you kindly advise me what to do with a young orchard four years old consisting of pears and apples. I have been plowing the orchard every fall and practicing clean cultivation all summer.—E. L., Utah.

ANSWER: It is not a good thing to practice continued clean cultivation in an orchard. Young orchards need more cultivation than old orchards, but even young orchards are damaged by excessive cultivation.

It is all right to practice clean cultivation during the growing season, but you should plant a cover crop of cowpeas, soybeans, vetch, rye or oats about mid-summer. This will check the growth and compete with the trees for moisture and fertility, thus promoting proper maturity of the wood.

If your ground is not subject to washing, it would be well to plant cultivated crops, such as vegetables, between the trees or to practice clean cultivation early in the season. If clean cultivation is practiced, you should plant a cover crop about the middle of July. This method will give your trees the proper care during the growing season as well as keep your ground rich in organic matter.

Coming Horticultural Meetings

ANNUAL meeting Ozark Fruit Growers' Association, Monett, Mo., January 5-6. Secretary, J. W. Stroud, Box 150, Rogers, Ark.

Annual meeting Massachusetts Fruit Growers' Association, in connection with the annual Union Agricultural Meeting, State Armory, Worcester, Mass., January 5-7. Secretary, W. R. Cole, Amherst, Mass.

Thirty-seventh annual meeting South Dakota Horticultural Society, Sioux Falls, January 5-7. Secretary, N. E. Hansen, Brookings, S. D.

Annual meeting Rhode Island Fruit Growers' Association, Providence, January 8. Secretary, R. W. Bowen, Apponaug, R. I.

Annual meeting New York State Horticultural Society, Edgerton Park, Rochester, January 13-15. Secretary, Roy P. McPherson, Le Roy, N. Y.

Annual meeting Tennessee State Horticultural Society, Chattanooga, January 18-20. Secretary, G. M. Bentley, Knoxville, Tenn. Field Agent, J. L. Baskin, Knoxville, Tenn.

Annual meeting Tennessee State Horticultural Society, Chattanooga, January 18-20. Secretary, G. M. Bentley, Knoxville, Tenn. Field Agent, J. L. Baskin, Knoxville, Tenn.

Annual meeting Pennsylvania State Horticultural Association, in connection with State Farm Products Show, Harrisburg, January 19-21. Secretary, S. W. Fletcher, State College, Pa.

Annual meeting Ohio State Horticultural Society, in connection with Annual Farmers' Week Program, Ohio State University, Columbus, Ohio, February 1-5. Secretary, F. H. Beach, Columbus, Ohio.

Beekeepers' short course, Purdue University, Lafayette, Ind., February 15-18. Address J. J. Davis, Chief in Entomology, Purdue University, Lafayette, Ind.

Joint Meeting Proves Successful

THE JOINT meeting of the American Pomological Society, the Central States Horticultural Exposition, the Kansas State Horticultural Society and the Missouri State Horticultural Society at Kansas City, Mo., December 8-10, proved a success from every viewpoint. The attendance was good and the spirit of the meetings was excellent. There was some difficulty in hearing the speakers because of the largeness of the room and the noise from the adjoining exhibit hall. Most of the speakers were present, though some of them sent their papers. There was a large exhibit of fruit, materials and equipment.

The pomological society elected the following officers: President, Paul C. Stark; Vice-President, J. C. Blair; Second Vice-President, W. T. Macoun; Secretary-Treasurer, H. C. C. Miles.

Board of Managers: R. A. Van Meter, H. B. Tukey, A. J. Farley, Paul Stark and H. C. C. Miles.

Executive Committee: F. R. Cranefield, W. L. Howard, W. S. Brown, M. J. Dorsey, R. E. Marshall, Robert Simpson, C. A. Bingham, R. A. Van Meter, H. B. Tukey, A. J. Farley and C. D. Matthews.

The Wilder medal was not awarded this year, although a number of interesting apples, pears and grapes were exhibited for it. The committee asked for more time to observe the merits of these new introductions.

The following officers were elected by the Central States Horticultural Exposition: President, Albert Dickens, Manhattan, Kans.; Vice-Presi-

dent, E. P. Sandsten, Ft. Collins, Colo.; Secretary-Treasurer, G. W. Catts, Kansas City, Mo.

The exhibit of fruit, materials and equipment attracted keen attention. Practically all of the fruit consisted of apples, and there were numerous varieties of these from many states. In the state exhibits, Kansas took first prize. This exhibit consisted of a huge square of apples placed at an angle of about 45 degrees, in the center of which the apples were arranged to represent a great sunflower. The center or disk was of red apples, the petals of yellow apples and the background of red apples. Other box and plate exhibits made a pleasing foreground to the entire exhibit. Nebraska, Missouri, Colorado, Iowa, Idaho and Minnesota ranked next in the order named. The student judging contest was won by Missouri, with Kansas second and Oklahoma third. L. C. Thornton of Missouri was high man, with a score of 916.5.

The grand sweepstakes prize for winning the most money in prizes was won by Patterson McBain of the Riverview Orchards, McBaine, Mo. Mr. McBain won a total of \$157.50 in prizes. A total of \$4000 was distributed as prizes, and there were 173 exhibitors. Fruit was exhibited from 16 states.

George W. Catts, Secretary of the Central States Horticultural Exposition, deserves a lot of credit for the success of the exhibit. Arrangements had been so thoroughly perfected that the show proceeded without a hitch.

How to Hasten Bearing in Apples

(Continued from page 14.)

of the top after growth has started (Figures 4 and 5). Dormant season pruning tends to increase suckering and shoot growth. By pruning after growth has begun, the treetop remains open through the early growing and bud-forming period. The improved light conditions help to secure the plumpness of growth needed for bud formation. Obviously, this cutting should be limited to the upper part of the tree. Do just as little cutting as possible to give good light in the upper part of the treetop. This pruning is very different from the so-called summer pruning, which includes tipping and also the removal of all cross or crowding branches throughout the top. Tipping in the summer is generally ineffective unless a second growth is produced after the pruning is done. Few trees in the east grow rapidly enough to make such a second growth. Again, summer pruning does not generally work, as the removal of all crossing and undesirable branches

in such a tree as shown in Figure 4 constitutes such a heavy pruning that the tree is made more vegetative, that is, any tendency to induce bearing by improving the light conditions in the top is offset by the excessive pruning about the bottom.

Better Light is Usual Need

The usual need in young non-bearing trees is better light. Only as a last resort should the cultural treatment be changed to check the tree growth. If possible, keep up a strong growth, as it is difficult to maintain a bearing tree sufficiently vegetative to bear well. (See Wisconsin Agricultural Experiment Station Bulletin 378 on "Prune the Bearing Tree.") Use pruning or other special methods to induce blossoming and at the same time keep the trees strongly vegetative so that large, regular crops can be harvested after the bearing condition is established.



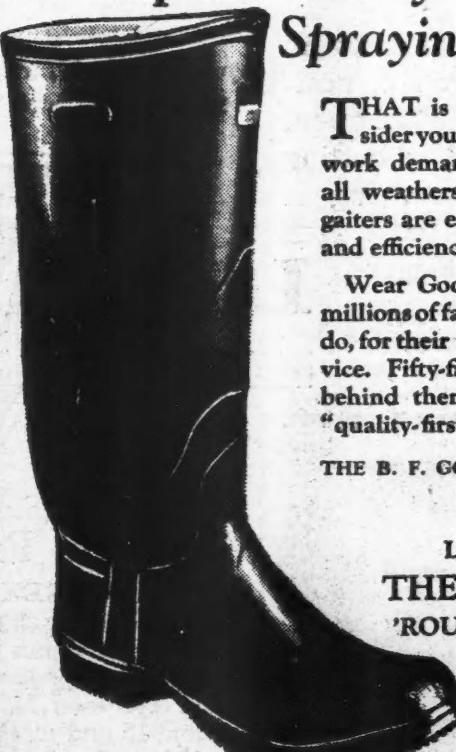
Figure 4.—This unpruned Transparent tree is so dense that blossom buds do not form



Figure 5.—Same tree as shown in Figure 4 after the top was thinned during the growing season



As Important as your Spraying Equipment



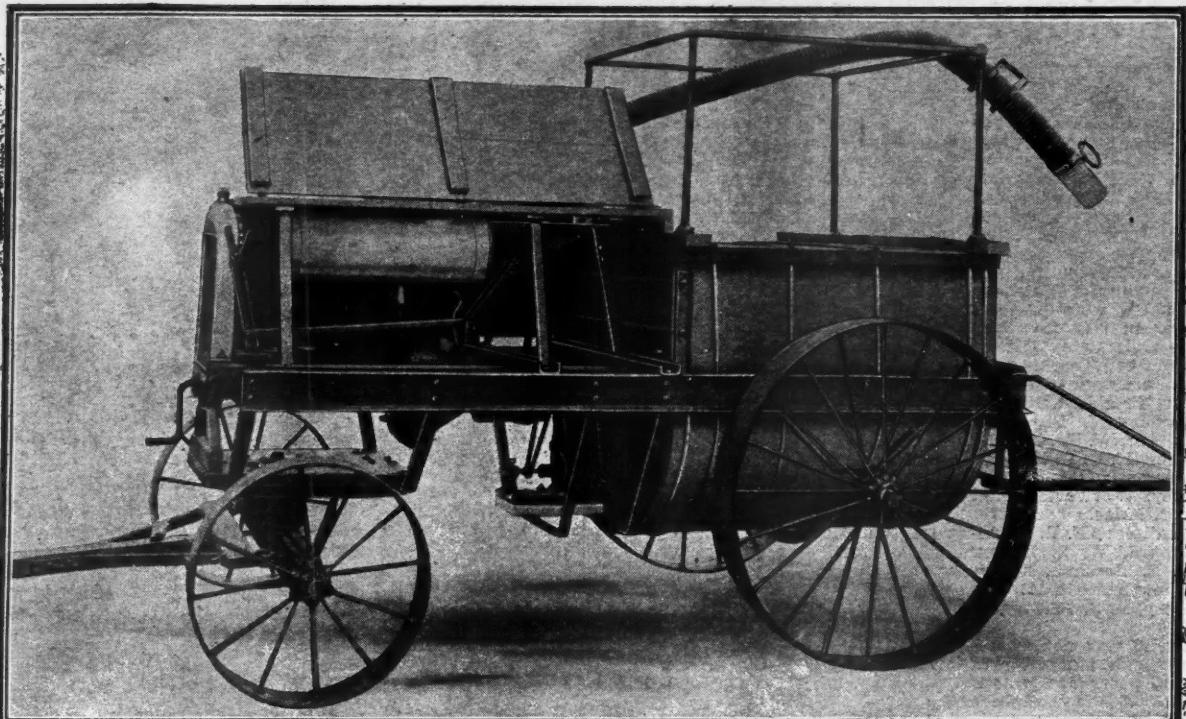
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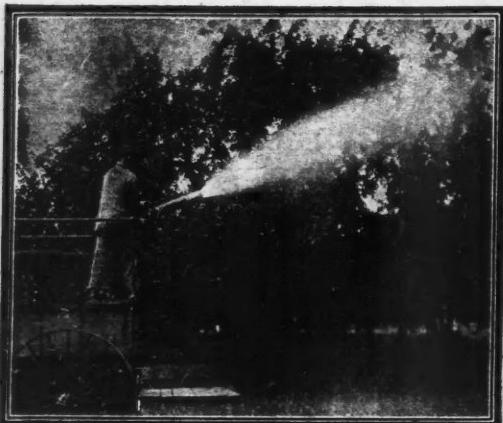


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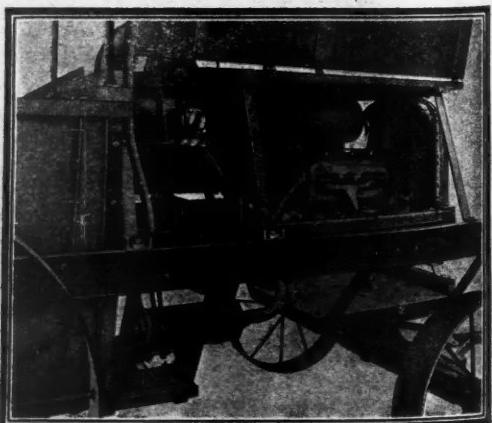
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REX LIQUI-DUSTER

Pruining the Bramble Fruits

(Continued from page 15.)

vigor and the system of training used. Obviously, if the blackberry and the black and the purple raspberry have been properly summer pruned, very little if any heading-in of the main canes need be done. However, if the shoots have been allowed to grow without pinching the preceding summer, some cutting back will be necessary. When the black raspberry is grown in this way the canes must be pruned more severely than those of the blackberry or the red raspberry. The heading-in or topping of the red raspberry often consists in cutting off only that portion which is injured during the winter, but if a vigorous growth has been made and the canes attain a height of six or more feet, a more severe pruning is necessary. Experiments with the Cuthbert raspberry at the Michigan Experiment Station during the past season show that the best yields are likely to be obtained with a medium pruning. Vigorous unbranched canes which were headed at four feet and carrying about 25 to 30 buds out-yielded canes six feet high which carried 50 or 60 buds, and the berries were much larger in size. When the canes were headed much lower than four feet, the number of berries was less, and there was a corresponding decrease in total yield.

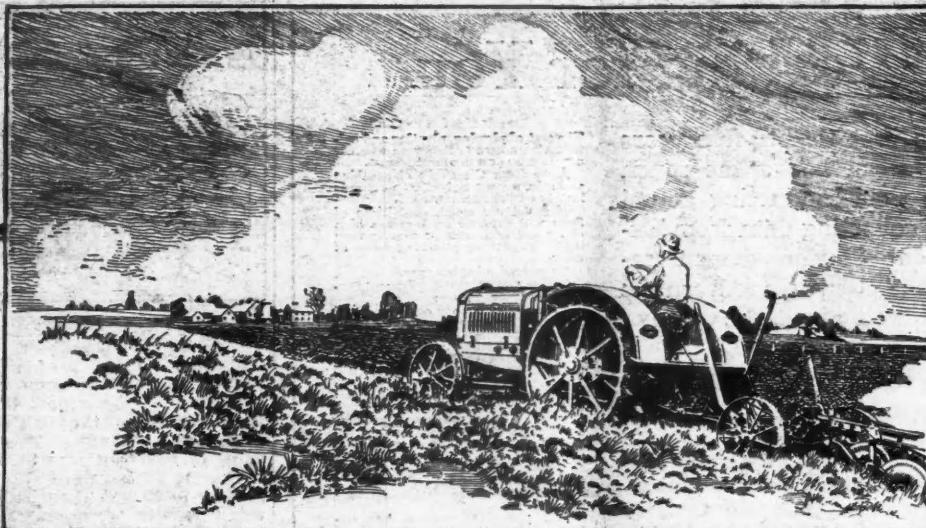
Dormant Pruning of Raspberries

With the black raspberry and the black and the purple raspberry, the dormant pruning consists chiefly of heading-in the lateral branches. The most important effect of heading-in the laterals is an increase in the size of the berries. There is also some increase in the number of berries per cluster. The severity of heading-in the laterals will depend somewhat on the vigor of the canes and also on the fruiting habit of the variety. With the black raspberry, the best buds for fruiting are found at the base of the laterals near the main cane and on the main cane itself and for this reason it will respond to a comparatively severe pruning. In the past the general recommendation has been to head-in the laterals to 12 to 18 inches in length, but it has been found that under Michigan conditions a more severe pruning does not decrease the total yield, and the berries are much larger and of better quality. Canes approximately one-half inch or less should have their laterals shortened back to four buds in length, while those larger than one-half inch can carry laterals six or eight buds in length, depending on the size of the cane. In a commercial plantation near South Haven, Mich., four-bud pruning as compared to the usual long pruning resulted in a total yield of nine more cases per acre, and the berries were larger, making it possible to save 30 per cent or more in the time of harvesting the crop. With the blackberry, the maximum amount of good quality fruit is produced when the laterals are cut back at least one-half, reducing the number of buds to from seven to nine. Occasionally, it is necessary to shorten the laterals of the red raspberry. These should be left somewhat longer, as the basal buds tend to remain dormant or produce vegetative shoots.

Rambles of a Horticulturalist

(Continued from page 7.)

Dr. Winberg. Various phases of the subject were covered in addresses by Dr. Winberg, by Carl B. James, Agricultural Agent for the L. & N. Railway, with headquarters at Montgomery, and the writer. About 75 growers attended, notwithstanding the hot weather and lots of work at home. Keen interest was manifested in the subject and many questions were asked. There is little doubt but what grape culture will be greatly extended in Baldwin county in the next few years. The same varieties and methods of culture apply here as in western Florida.



A Recipe to Make Farming More Profitable

THE other day one of the great American leaders, a self-made man to whom other men listen with great respect, made two very simple statements that have an important bearing on farming.

First, he said: "One great problem before us is the need of reducing costs. Success comes to the man who makes anything as good as anybody else, but also makes it cheaper!"

Here he has hit on the farmer's biggest job. Today the old methods, old-fashioned equipment, and slow muscle power that turned out a good day's work in 1913 are eating deep into farm economy. The profit is bound to be slim for the farmer who does not cut costs to the bone. He must adopt the faster, more productive methods that add to income, and so raise his family's standard of living.

The further advice of this man is: "I don't believe in Ben Franklin's maxim about saving pennies. If you watch the big things the pennies will take care of themselves."

This is a plea for the most practical kind of economy—a plea for making money, rather than saving money. It comes from a man who began

at the bottom of the ladder and built up a great business. If he had hung onto pennies, afraid to invest in money-making equipment, he never would have been heard of. In industry the old equipment is scrapped, no matter how costly, as soon as better, cost-reducing equipment comes on the market. In farming it must be the same.

A new year of farming is ahead. How profitable can you make it? The question hinges largely on equipment. The methods of 1860 would force a family into poverty to-day. The methods of 1913, too, fall far short of the changed needs of to-day.

You are living and farming in the mechanical power age. The McCormick-Deering builders have developed a long line of modern, big-scale machines to work with McCormick-Deering tractor power and to help the farmer in his battle with production costs.

This winter, check your old equipment against the work to come next spring and summer, talk things over with your family and resolve to make your farming more efficient, and make it easier, too. See the McCormick-Deering dealer; profitable farming begins at his store.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America
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MCORMICK-DEERING TRACTORS are always ready for field and belt work. They also have the power take-off feature for running the mechanism of field machines. They are equipped with throttle governor, adjustable drawbar, wide belt pulley, platform, fenders, removable lugs, brake, etc. They have removable cylinders, unit main frame, and ball and roller bearings at 28 points. They come to you complete—no extras to buy. They have plenty of power and long life. Made in two sizes, 10-20 and 15-30 h. p.

McCormick - Deering Tractors

Since these were discussed in the Rambles story of last month, it is unnecessary to repeat them here.

I was much interested in the sand pears growing in the section. The trees were laden with fruit. They looked ripe and appetizing, but they were hard as rocks and as coarse in texture as could be. However, the growers think quite well of them as a money maker. The trees bear heavily and for the most part regularly. The fruit is sold to canneries and after processing it makes an excellent product. The trees are very resistant to blight. There are trees on nearly every farm, and there are a number of orchards in the county of 100 to 250 trees.

There is a marked interest in dewberry culture. The principal cause is

the development of the Young dewberry, which was originated in Louisiana by B. M. Young. The berry seems particularly fitted for culture in that section, as well as elsewhere, and the indications are that extensive plantings of it will be made in the next few years. Mr. Sam Beatty of Fairhope helped to perpetuate the stock of this variety in its early years, during which time it was almost lost. At present Mr. Beatty is growing plants under contract for a nursery. He is much interested in plant breeding and has a large amount of interesting material on his place.

Baldwin county and other localities in the Gulf Coast states offer excellent opportunities. They can grow a wide variety of crops successfully. The season is long. Their

early products are among the first to reach the markets. Any locality having a good soil and having good railroad connections is bound to offer good opportunities to ambitious people.

THREE are 2160 county agricultural agents in the United States. They made a total of 2,619,614 personal calls at farms during 1924, or an average of 1213 per agent. It is estimated that over 4,000,000 recommendations made by agents last year were followed out by farmers.

Approximately 600,000 boys and girls were enlisted in boys' and girls' club work last year. They made about 258,000 reports which met all requirements.

Working for You

In the past twenty-five years this Bureau has spent much of its time conducting actual trials, collecting data from Experiment Station demonstrations and elsewhere to learn the actual facts about the value of

NITRATE OF SODA in fertilizing crops.

There is no guess work in the Bulletins we send out on this subject. Farmers throughout the Country who have read them and have followed our advice have added by their own testimony to the overwhelming evidence in favor of the use of Nitrate of Soda for profitable results.

There is a sure way of learning definitely just how profitably you can use Nitrate of Soda on your own land. Demonstrate it on one of your own crops.

Mark off two plots of one acre or half an acre each. On one of the plots, use Nitrate of Soda, 200 lbs. per acre for cultivated crops or 100 lbs. per acre for other crops. On the second plot use no Nitrate.

Harvest the plots separately and weigh or measure the results.

The cash value of the increased crop on the Nitrated plot over that on the check plot will show you just what profit comes from the use of the Nitrate.

If you want our Free Bulletins full of truths about Nitrate of Soda, send us your address, name your principal crops and for our information add the number 3620.

Chilean Nitrate of Soda—EDUCATIONAL BUREAU Dr. William S. Myers, Director

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201 Cotton Exchange Bldg., Memphis, Tenn. 55 East State Street, Columbus, Ohio
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IS WHAT your stock eats more important than what your family eats? No crop can be more valuable than a good, well-kept home garden. None pays bigger returns in cash, health and satisfaction.

Planet Jr. Seeders and Wheel Hoes take the work out of gardening. YOU will be surprised at the work and time they save, their accuracy, easy handling and fine work.



Grow what
you eat!

Planet Jr.



NOTWITHSTANDING the serious freeze of December, 1924, the California citrus growers received \$93,581,263 for the crop of 1924-25, according to the report of Manager E. G. Dezell of the California Fruit Growers' Exchange. The delivered value of the fruit was \$122,245,523.

The receipts were 75 per cent greater in 1924-25 than in 1923-24 and these results were obtained with a volume of 49,437 cars as compared with the movement of 60,732 cars in 1923-24. The orange and grapefruit shipments totaled 37,679 cars and the lemon shipments 11,758 cars.

The California Fruit Growers' Exchange handled 75.4 per cent of the California citrus crop, or 37,258 cars. It returned \$70,236,507 to its members, as compared with \$50,508,184 in 1923-24, when 44,266 cars were shipped by the exchange. The shipments were 16 per cent less in 1924-25 than in 1923-24, but the f. o. b. returns were 39 per cent larger. The returns were 27 per cent greater than in 1922-23, when the value of shipments was practically the same as in 1924-25.

A grave situation was faced immediately following the freeze when the law covering the shipment of frosted fruit was declared invalid. Enforcement of county ordinances prevented much frozen fruit from shipment. The exchange, through a forceful educational policy, succeeded in preventing the shipment of most of the damaged fruit. The exchange has succeeded in getting legislation passed that should effectively protect the industry against a similar occurrence in the future.

Citrus shipments for the first six months of the season were greater than in 1923-24, but due to intelligent distribution of fruit, avoiding surplus supplies and allowing the fruit to go into consumption promptly, the exchange was able to make a stable market and thus sell the fruit to the advantage of growers.

The marketing cost, including advertising, amounted to 2.4 per cent of the delivered value of the crop. This cost is materially lower than the marketing charges of any other citrus agency, according to Manager Dezell.

Besides the fresh fruit shipments, by-product production plays a large part in the affairs of the exchange. About 800,000 pounds of citric acid, 30,000 pounds of lemon oil, and 30,000 pounds of citrus pectin were produced by the Exchange Lemon Products Company. These by-products took care of 1200 cars of unmerchantable fruit. A rapid increase in the sale of concentrated orange juice, which is being sold to the beverage trade by the Orange Products Company, has taken place. The company is increasing its capital stock preparatory to building a larger factory.

The Fruit Growers' Supply Company, which is the purchasing organization of exchange growers, conducted a business amounting to \$8,548,479 during the year. This included purchases made for growers and sales on lumber from the timber operations of the company.

THE FOLLOWING statement, taken from the *Seald-Sweet Chronicle*, expresses very clearly the attitude of mind which every grower should have when joining a co-operative association. We hope all readers who have ever had anything to do with co-operative marketing, or who expect to have something to do with it in the future, will read this statement carefully. If

all members would put themselves into the full spirit of this statement, there would be fewer failures in co-operative marketing.

"When a fruit grower signs a contract to market his crops through the Florida Citrus Exchange he becomes a component part of this organization. He does not become a 'customer' or 'client,' as does the grower who makes a sales agreement with a commercial organization. His action is one of affiliation. He becomes a 'member,' with a voice and vote equal to that of other growers in the conduct and operation of an organization created for the sole purpose of serving them. Every benefit and financial return resulting from the operation of the Florida Citrus Exchange accrues directly, and solely, in equal proportion, to its grower-members."

"A grower should understand this when he signs up with the Florida Citrus Exchange. In aligning himself with this co-operative organization, he promises to work with his fellow-growers in the operation of a citrus fruit marketing machine to sell crops at cost and in a manner which gives them the greatest money returns. He subscribes his belief in the fundamental principles involved in co-operative marketing, and agrees to be governed by the fruit packing regulations established by officers, in the election of whom he has a vote. He is obligated, at least in a moral sense, to support and work for the advancement of the Florida Citrus Exchange, for in becoming one of its members, the Florida Citrus Exchange becomes 'his' organization; and he shares the responsibility with its other grower-members for its success or failure."

THE FOURTH annual co-operative marketing conference of the National Council of Co-operative Marketing Associations will be held in Washington January 12-15 inclusive.

A special feature of this conference will be a meeting of general managers and sales managers to discuss price predicting. Prominent authorities will address them on this subject.

In view of conditions, co-operative legislation will be a topic of chief consideration. It is expected that the conference will take a stand against government control legislation for cooperatives, which is being promoted from some quarters. The chances are good that the plans of Secretary Jardine for establishing a department of co-operative marketing within the Department of Agriculture will be favored. Field service and membership relations will also be given consideration. Headquarters will be at the Lee House. Those interested should make early application for accommodations.

THE FOUNDATION for co-operative marketing of farm products is not found in laws, contracts or other legal evidences of the machinery of marketing corporations. The real foundation for co-operative marketing is found in the intelligent mutual expressions of the farmers themselves to band together to distribute their products through co-operative effort. There must be consecration to the cause. There must be determination to make it succeed. These are the elements that constitute the foundation for co-operative marketing.

"Laws, contracts, incorporations, papers and other legal evidences, however, contribute quite materially to

the degree of efficiency with which the above stated 'intelligent, mutual expressions' are moulded into practical marketing associations. Farmers have finally decided that the organization of corporations which give

them a definite legal standing on equality with all other business enterprises is the proper way to put into working harness their desires to market their products."—Missouri Marketing Bulletin.

Propagation of Fruit Plants

(Continued from page 14.)

from straight cuttings made from one-year-old shoots. The cuttings may be collected in the fall and held in the usual storage manner until spring, when they are lined out in a nursery row. If a sandy soil is available, it is sometimes possible to secure a fair stand of vines by making the cuttings in the early fall and planting immediately in a nursery row. They should be mulched with straw or similar material during the winter to prevent drying out or winter injury. The currant cuttings are generally made about eight inches in length and may be planted in the nursery row two to four inches apart. It requires two years' growth in the nursery to produce a strong plant suitable for transplanting. Currants may also be propagated by mound layering in the same manner as are gooseberries but since they strike root so readily from cuttings, the more cumbersome mound layerage is not recommended.

Gooseberries

The gooseberry does not always strike root readily when hardwood cuttings are used, so a method of mound layering is recommended. Since the method has already been described, the directions need not be repeated at this point. It is sufficient to point out that roots will generally be formed the first season so that the mound may be removed, and the rooted shoots separated from the parent plant and lined out in the nursery row the spring of the second year. They will ordinarily develop sufficient size to make them suitable for transplanting with one year's growth in the nursery row.

If an attempt is made to propagate the gooseberry from hardwood cuttings, it should be handled in the same way as currants, using the spring planting system.

Strawberries

Strawberries are so easily and commonly grown and propagated that it would seem unnecessary to describe the method used. The strawberry plant forms new plants from runners. These new plants are dug in the spring and transplanted to the place desired. The most important point in connection with this process is to secure the largest and strongest young plants which are available. These would be runner plants which had become rooted and established comparatively early the preceding season. Such plants, because of their vigor, start earlier and form new runner plants more quickly than would weak stock. The importance of this item from the grower's standpoint lies in the fact that runner plants formed early in the season are more productive than those set later in the season. A runner plant which takes root in the fall will not have time to grow a strong crown and form fruit buds for the following season's crop. Consequently, these late formed runner plants are frequently barren and are merely weeds in the fruiting bed.

If strawberry plants are to be packed for transportation, they should be tied compactly in bundles and so packed that the leaves are exposed to the open air, while the roots are surrounded with moist packing material to prevent drying out. If the tops as well as the roots are enclosed in the wrapper, they will quickly become spoiled and unfit for planting. Strawberry plants should not be dug in the spring until there is some indication of leaf growth. Digging should not be delayed, however, until this leafy growth is well advanced, because at that time the foliage is large, succulent and full of water and is difficult to pack without danger of heating.

Cranberries

The cranberry is a specialized crop

in which only a few are directly interested. It is propagated always by means of cuttings. These are secured by mowing the slender vines with a heavy scythe and chopping them up roughly into segments about six or seven inches in length. Such cuttings are planted directly in the field, spacing them approximately seven inches apart each way. Usually two or three cuttings are planted together to insure a complete stand.

Blueberries

Both the high and lowbush blueberry are being grown to limited extent under cultivation. Both may be propagated through a division of a clump, the plant being separated into as many rooted sections as possible. Another method commonly used is to select underground stems or rhizomes which may have already started to root. These are planted in nursery rows where they are grown for one or two years in a manner similar to currant cuttings. By the end of the second year they will be large enough to transplant into the fruiting bed.

Would-be blueberry growers should not be over optimistic. The blueberry thrives naturally on an acid soil, and as a general proposition it does not succeed under ordinary garden conditions.

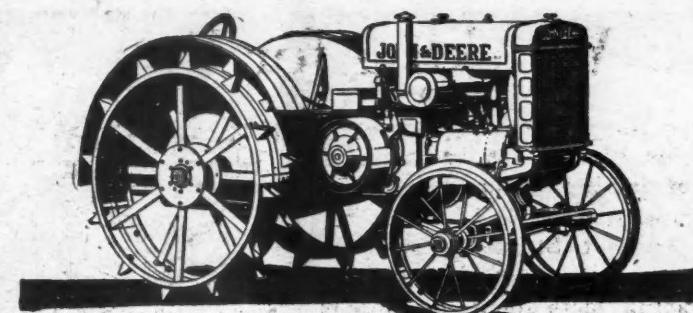
Illinois Society Meets

THE SEVENTIETH annual meeting of the Illinois State Horticultural Society was held at Urbana on December 16-18. An excellent program was presented and the meeting proved successful from every standpoint.

Because of the damage from late summer drought this year, members were much interested in a paper by Dr. W. A. Ruth of the Department of Horticulture, who treated the subject from physiological as well as a practical standpoint, discussing cultivation, cover crops, planting, irrigation, etc. Vernon Vanniman of the Illinois Agricultural Association discussed crop insurance and stated that the use of such insurance was increasing. Professors B. L. Weaver, C. A. Garnier and R. S. Marsh of the Department of Horticulture described the work the department is doing along fruit and vegetable extension lines. Dr. M. J. Dorsey discussed annual and bi-annual bearing in apples and gave recommendations as to how annual bearing can be encouraged. C. E. Durst of the AMERICAN FRUIT GROWER MAGAZINE spoke on the merchandising and advertising of Illinois fruits. Dr. A. S. Colby gave recommendations as to the varieties of small fruits best adapted for culture in Illinois.

E. S. Briggs, Secretary of the American Fruit and Vegetable Shippers' Association, discussed the proposed freight rate increase from the standpoint of fruit and vegetable growers. He presented figures showing that the railroads are now making greater returns on the capital invested than farmers, and he took the view that instead of an increase there should be a decrease for fruit and vegetable growers, who are now shipping about 1,000,000 cars annually. Frank Simpson reported on the joint meeting of the Central States Horticultural Exposition and the American Pomological Society at Kansas City.

At the spray session, Dr. W. P. Flint summarized the insect situation for 1925 and gave recommendations based on the most recent investigations. Dr. H. W. Anderson presented his usual summary for the state for the year, and in this he included the blooming dates, frost dates, time of appearance of insects and diseases, and other information of historical value. In another paper he described



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THE TRADE MARK OF QUALITY MADE FAMOUS BY GOOD IMPLEMENTS

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a new spray for the control of bacterial spot of the peach. There was a marked interest in dusting and dusting materials, especially for peaches.

At the banquet Prof. J. C. Blair described the life and work of E. A. Riehl and Rev. J. R. Reasoner, members of the society who died during the past year.

A resolution was passed authorizing the president to appoint a committee to consider ways and means of increasing the consumption of Illinois fruits. It was also voted to send a representative to the forthcoming Kansas City hearing to represent Illinois growers in the freight rate question.

The new officers are L. M. Smith, Ozark, President; Wilbur Soverhill, Tiskilwa, Vice-President; H. W. Day, Springfield, Secretary; and J. W. Stanton, Richview, Treasurer.

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Do you realize that it's only about 60 days before it will be time for your dormant spray? It is not a bit too early to begin you planning now.

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Arsenate of Lead Calcium Arsenate Lime Sulphur
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Niagara

"Kolo" Dusting Materials

The New Dusts you can see Stick
give more permanent protection from each application

Kolodust and Kolotex are the trade names of two patented Niagara Dusting Materials which embody the only obvious improvements which could be made to our already successful Sulphur Dusts now so extensively used for Disease and Pest Control.

These "Kolo" Dusting Materials have sticking properties not found in any other dusting material. They may be applied with equal effect to either wet or dry foliage, and after once "set," will stick for weeks through rain and wind. This dust is a visible sticker. You can see it plainly without lens or microscope. Experiments demonstrate that this sticker dust retains a larger percentage of sulphur on the leaf surface for a longer period than is the case of "Lime Sulphur" solution, or most any other liquid spraying material.

Niagara KOLODUST

Kolodust is the Superior Fungicidal Dust for all applications where no poison is necessary for chewing insects.

Kolodust is strictly a Fungicide to be used in the prevention of outbreaks of "Apple-Scab," "Brown-Rot," and many other fungus diseases by the Dusting Method.

For the present, production will be limited, but it is hoped that sufficient of these materials will be available so that all progressive fruit growers may have the opportunity for testing their worth.

See your dealer or write for booklet H.

Niagara KOLOTEX

Kolotex is the Superior Fungicidal Dust combined with Poison for chewing insects, for application where it is desired to control chewing insects as well as fungus diseases.

The peculiar properties of the Kolotex with which poison is combined with this material gives us a new and superior vehicle for carrying a lasting application of poison to fruit and foliage.

For the present, production will be limited, but it is hoped that sufficient of these materials will be available so that all progressive fruit growers may have the opportunity for testing their worth.

Niagara SPRAYER COMPANY

Middleport, New York

Hand—Traction and Power Dusters

Markets and Marketing



ALTHOUGH CANADA is a large producer of apples, the annual crop varying from 4,500,000 to 6,000,000 barrels, considerable quantities are imported from the United States on account of seasonal and geographical factors. In 1924 the United States exported to Canada 556,868 boxes and 35,936 barrels of apples, with a total value of \$934,654. The largest proportion of such exports went into the central provinces of Ontario and Quebec. The prairie provinces were also important buyers, while smaller quantities were taken by the maritime provinces and British Columbia.

Most of the American apples handled by Montreal importers are packed in boxes, and the preference is for red apples, particularly Winesaps, which are the favorite variety for the late-season demand. A few cars of Rome Beauty apples, mostly the large sizes sold for baking purposes, are also imported, states L. W. Meekins of the Department of Commerce. The customary method of handling shipments in Montreal is on an outright purchase basis, through local brokers, a number of whom represent larger American apple exporters.

The principal grades of apples handled in Toronto are fancy, extra fancy, and C grade; and purchases are made f. o. b. shipping points in the United States.

The prairie provinces are now plentifully supplied with British Columbia and Ontario apples, and the quantity of apples coming in from the United States this year is limited. Most of the fruit jobbers in Winnipeg buy an odd car of American apples from time to time if conditions warrant it.

The province of New Brunswick is the principal market for American apples in eastern Canada. Most of the wholesale fruit dealers handle them, and usually import them in carload lots. The principal variety is extra fancy Winesapse from Washington and Oregon; Gravensteins from California, also Jonathans and Staymans from California, are brought in occasionally. Both large and small dealers buy quite freely at certain times in small quantities from Boston, Mass., dealers. In practically every case the apples are sold outright to the Canadian importers.

Any person or concern listed on the exporters' index of the Bureau of Foreign and Domestic Commerce may secure a list of Canadian apple importers, dealers, and brokers, in the principal cities, by writing to the Foodstuffs Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., or by consulting the bureau's district office.

THE QUANTITY of dried fruits processed in Australia for the first six months of 1925 was 36,900 tons, consisting of 20,319 tons Sultanas, 11,652 tons currants, and 4,940 tons Lexias. There will be available for export about 25,750 tons, including 15,900 tons Sultanas, 7500 tons currants and 3250 tons Lexias. It is estimated that 22,500 tons will be exported to the United Kingdom.

AS WAS expected earlier in the season, the shipments of citrus fruits from Florida have ranged under those of last year. For instance, 886 cars of oranges were shipped this season to November 13 as compared with 1510 cars for the same period last year, and 1763 cars of grapefruit this season as compared with 2336 during 1924-25.

The market has been holding very firm. Oranges were bringing \$4.50 to \$6.75 f. o. b. shipping point during October and November. At the auction centers they brought prices ranging mostly from \$7.25 to \$9.50 per crate. Grapefruit was bringing \$2.50 to \$3 per crate at shipping points and \$2 to \$6 per crate in auction centers. Heavy shipments of grapefruit from Porto Rico early in the season had a depressing effect on all eastern markets.

THE PENNSYLVANIA Bureau of Markets has kept inspectors at 10 shipping points during the two busiest picking months the past fall. As a result, about 50,000 barrels of apples have been inspected. The packages were marked as United States Grade No. 1 where the conditions warranted such marking. The fruit was of excellent quality as a rule and about 75 percent of the fruit inspected met the requirements of the United States Grade No. 1.

The inspection work is proving popular with both dealers and consumers. Many buyers are beginning to inquire for inspected fruits. It is said that this demand is due to requests by consumers for the inspected fruit.

IN KEEPING with the recommendations of the Maryland State Horticultural Society, made at the winter meeting last year, the Maryland Board of Agriculture recently adopted the United States grading rules for barreled apples as the standard for Maryland. The Department of Markets was authorized at the same time to administer the application of the grades and classes for apples packed in closed packages in the state. To the Bureau of Markets was also given "powers of inspection, regulation and adjustment of scales, beams, weights and measures used . . . in the vending or purchasing of agricultural products and farm supplies."

This is a good step. The weight and measure regulations of many of our states need revising, and it is a question which many states should give attention to. The quicker that the various states develop a system in harmony with the plan approved by the United States Department of Agriculture, the better it will be for the growers of farm products and the public in general.

THE STRIPES Packing Company of Fort Myers, Fla., is marketing its fruit through the Florida Citrus Exchange the present season. This company owns the famous Stripes brand of citrus fruits. It has marketed independently for the last three years. The company withdrew from the exchange some time ago due to dissatisfaction but now that the exchange operations have been modified in a manner that meets the approval of the officers of the Stripes Packing Company, that association is back in the fold and will help to make the exchange a success.

DURING the year closing on July 1, 1925, a total of 521 cars, or 226,281 boxes of citrus fruit, were shipped from the Rio Grande Valley of lower Texas. It is estimated that the shipments for the 1924-25 season will reach approximately 1000 cars.

THE PRODUCTS of the Murphy groves in Lee county, Florida, now owned by Elmer Jones, are being marketed through the Florida Citrus Ex-

change this season. The groves will produce 20,000 boxes, it is estimated. This tract was formerly the property of the Standard Growers' Exchange of Orlando. It comprises 130 acres of citrus fruits in Lee county. Mr. Jones, who recently purchased the property, is head of a syndicate of real estate operators located at Fort Myers.

The fruit will be marketed through the Lee County Co-operative Association and the Fort Myers Citrus Association.

THE UNITED STATES exports considerable quantities of oranges to the United Kingdom, but British statistics indicate that for each of the years 1920-23 imports of oranges from the United States comprised less than one per cent of the total takings by the United Kingdom. Canada is the largest purchaser of United States oranges, taking 90 per cent or over in each of the years 1920-24. In 1924, out of the total exports of 2,564,043 boxes of oranges, valued at \$8,687,997, from the United States, Canada took 2,367,018 boxes, valued at \$7,550,144, while England took but 112,731 boxes, valued at \$414,641.—D. J. Moriarty.

THE COST of marketing a bushel of apples in Massachusetts in 1923 on the average was as follows, according to Bulletin 224 of the Massachusetts Agricultural Experiment Station:

	Cost per bushel
Operations.	\$0.10
Picking	.13
Sorting, grading and packing	.02
Container	.02
Hauling from orchard	.02
Hauling to station	.05
Hauling to market	.15
Selling	.19
Average costs of marketing apples hauled to market:	\$0.87
Storage	.02
Hauling from storage	.05
Average costs	\$1.15

A USTRALIAN fruit growers are much concerned over a proposal to bring the exportation of Australian fruit, especially pears and apples, under the control of a council similar to the dried fruits control board. The concern is all the greater because of the fact that it was understood a short time ago that the idea had been abandoned.

The Minister for Markets and Mi-

gration stated recently that the Australian government would be unable to give financial assistance to growers in the marketing of next season's crop. The government is no longer in position to meet the expenses of the Council, and therefore the Council will be compelled to provide its own revenues and conduct its own business affairs in the future.

The above report should interest American farmers and fruit growers in view of the discussion which has taken place in America during the last couple of years pertaining to government participation in the marketing and exporting of farm products.

CANADIAN government experts state that apple consumption has declined nearly 50 per cent in Canada in the last 20 years. During the same time orange consumption in Canada has increased 67 per cent, according to L. W. Meekins, American trade commissioner at Ottawa.

FEW PERSONS realize the enormous size of the canning industry of the country. The extent of this industry is shown clearly by the census report for 1923 on canned goods which was recently issued by the National Canners' Association. The report shows the number of cases of each kind of pack of the different fruits and vegetables, and also of fish and oysters. Those who are interested in this matter can probably obtain a copy of the report from the National Canners' Association, Washington, D. C.

A BULLETIN on advertising farm products has been issued by the North Dakota College of Agriculture. The author is Alva H. Benton. The principles of advertising are presented in a form which can readily be understood by growers and shippers of farm products. Besides giving a large amount of practical information on the subject, a list of reference books on advertising is included.

"A DEED to a citrus grove recently recorded in Orange county, Florida, makes it mandatory upon the owner of the property to market his fruit through the Florida co-operative citrus exchange as long as the organization operates."

Monthly Market Review

THE FOLLOWING summary of the fruit marketing situation was furnished by the United States Bureau of Agricultural Economics on December 9:

"Prices toward the end of the year showed a rather moderate trend. Some fruits and vegetables went higher, but the majority showed a slightly downward tendency. The markets seemed to hesitate, uncertain which way to go after the rising markets of October and the November decline. The level is already rather high as compared with most recent years, but in view of the generally light to moderate production, there has been more or less expectation in some quarters that higher prices might even yet be reached."

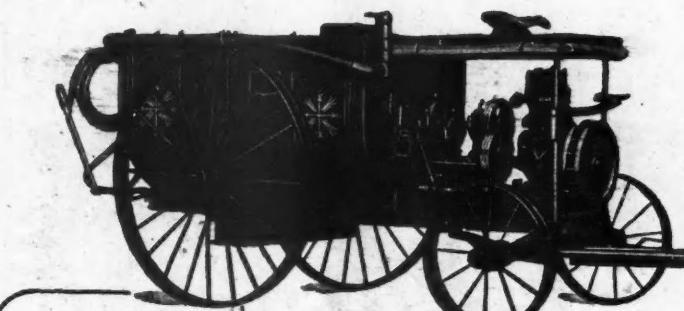
Fruit Prices Did Not Change Much
"Apples sagged off a little from the top price of the season. Cranberries went up before Thanksgiving and then declined about 10 per cent. Shipments of most fruits and vegetables began to decrease soon after the harvest season and are lighter than a year ago by about 10 to 15 per cent. The shortage of the available supply seems to show some effect upon volume of shipments, despite the tempting prices. With moderate competition expected from most kinds of southern winter vegetables, the general market outlook seems favorable from the seller's point of view."

Apple Prices Fairly Steady

The general price average of apples has not varied much since the right advance soon after the harvest.

season. Western fruit gained quite sharply in October but fell back slightly late in November and in the early part of December. The price of eastern barrelled stock also sagged off a little. The range generally has been somewhat lower than last season, both in the average of home markets and in foreign trade. Baldwins, of the leading market grade, entered the winter season at \$3.50 to \$5.50 per barrel, compared with \$5 to \$5.50 last year. Baldwins have suffered worse than other varieties because of the heavy production and the rather ordinary coloring of a large part of the crop. Greenings, being much less abundant than Baldwins this year, sell much nearer the price of a year ago. Northwestern boxed apples at \$2.50 to \$3.25 in eastern markets fall 25 to 50 cents below last season's range, but shipping points quote only 10 to 15 cents lower than last season for most kinds.

"The lack of sustained strength in the apple markets in a year of rather light production and good demand is explained partly by the earliness of the crop everywhere and its tendency to mature early whether in country store-houses or in cold storage. Later kinds are coming to market before the mid-season varieties are out of the way. This general earliness tends to crowd the mid-season period slightly and strengthens the position of late-keeping stock in cold storage. Signs of more or less damage from freezing at harvest time or later are seen occasionally in stored apples, and such fruit, of course, is an unfavorable feature of the situation."



Bean Giant Triplex No. 733, capacity 15 gallons a minute at 350 lbs. pressure. A very popular outfit for large commercial orchards.



Bean "Simplicity"

Capacity of 5 1/4 gallons per minute at 250 pounds pressure sufficient to do good work with a spray gun or supply 2 rods. Furnished with or without truck.



Bean "Super Giant"

A real giant for work. Capacity up to 23 gallons a minute at 300-400 pounds pressure. For large acreages and where very rapid high pressure work is required.



Bean "Universal"

Designed for potatoes and other truck crops, but quickly converted into an orchard sprayer. Adjustable to any row.



Bean "Junior"

Best low-priced hand pump made for spraying, white-washing, etc. Simple, easy to operate, and especially adapted for use with tank or barrel.



Bean Barrow Sprayer

A handy outfit with many uses. Higher pressure than other sprayers of this type. Bronze ball valves, efficient agitator, reinforced steel tank, and other features.



Bean Power Duster

Mixes its own dust, thus cutting the cost of material in half. Simple, efficient, economical. For truck crops and orchard work.

Better Spraying —for More "Extra Fancy"

The big profits are in the extra fancy fruit. Inferior quality seldom pays the cost of production. Culls represent a big loss. Fruit of fancy quality and fine appearance is the fruit that pays. "Extra Fancy" fruit always enjoys the best markets and brings the top price.

The way to grow more "Extra Fancy" grade is to pay more attention to your spraying. Just a little better job, or an additional application of spray if it is needed, makes a big difference in your profit at the end of the season.

A BEAN Pays for Itself

A BEAN sprayer quickly pays for itself in extra profits from increased production of "Extra Fancy" fruit.

You do not save money by allowing your trees to go unsprayed, by trying to make a hand pump do the work of a power outfit, or by trying to do good work with a worn-out power rig that lacks power and capacity and the ability to give dependable service. You lose to the bugs many times what you think you save. Just a small increase in the percentage of fancy grade—the saving of just a small percentage of the culls—would pay for a first-class, high-grade Bean outfit that would give you real crop protection for many years and add many dollars to your profit every season.

The best investment any grower can make is a first-class spray outfit. And the best spray outfit any grower can buy is a BEAN.

Indestructible Cylinders

Bean porcelainized cylinders are used in all Bean pumps from the largest to the smallest. The original cylinder wall is of heavy cast iron which is very thick and cannot be damaged. This wall is not merely enameled but is heavily and permanently porcelainized. The porcelain coating is an integral part of the cylinder itself. It does not chip. It does not crack. It is not injured by acids, chemicals and sprays. There is no other sprayer on the market with cylinders like those in a Bean.

These indestructible porcelainized cylinders are but one of many distinctive Bean advantages, such as Bean Troubleless Ball Valves with Threadless cover and removable and reversible seat; Bean eccentrics instead of cranks; Bean Underneath Suction and Removable Strainer; Bean Pressure Regulator which enables you to take out any valve in the pump in two minutes without stopping the engine or losing the pressure; and many other features.

Two complete Factories

Two complete factories (Lansing, Michigan, and San Jose, California), each a complete manufacturing plant, building the entire Bean line; many complete stocks of repairs located at various centers; and authorized Bean dealers everywhere insure quick and easy access to parts and good service to Bean owners in every section.

Sign and send the coupon for new catalog and book of Better Spraying, which illustrates and describes the entire Bean line of Hand and Power Sprayers and Bean Power Dusters. Shows you how to get better pest control, grow finer fruit and make more money.

BEAN
ORCHARD AND CROP
SPRAYERS

BEAN SPRAY PUMP CO.

15 Hosmer St., Lansing, Michigan.
104 W. Julian St., San Jose, Calif.

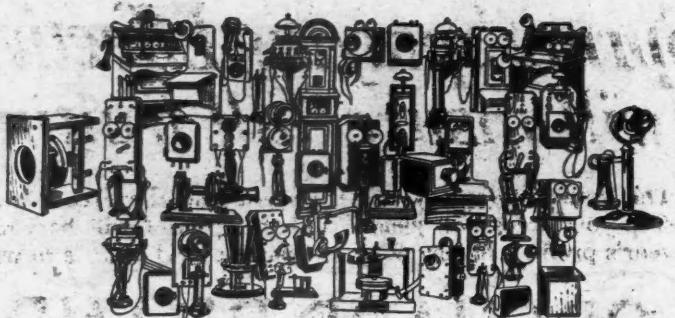
Please send me your new catalog and book of Better Spraying.

Acres..... Kind of Fruit.....

Name..... Address.....

American Fruit Grower Magazine
Farm Accounting for Fruit Growers

(Continued from page 5.)



An Account of Stewardship

FIFTY years ago Dr. Alexander Graham Bell was busy upon a new invention—the telephone. The first sentence had not been heard; the patent had not been filed; the demonstration of the telephone at the Centennial Exposition had not been made. All these noteworthy events were to occur later in the year 1876. But already, at the beginning of the year, the principle of the new art had been discovered and Bell's experiments were approaching a successful issue.

The inventor of the telephone lived to see the telephone in daily use by millions all over the world and to see thousands of inventions and developments from his original discovery.

If he had lived to this semi-centennial year, he would have seen over 16,000,000 telephones linked by 40,000,000 miles of wire spanning the American continent and bringing the whole nation within intimate talking distance. He would have seen in the Bell System, which bears his name, perhaps the largest industrial organization in the world with nearly \$3,000,000,000 worth of public-serving property, owned chiefly by its customers and employees.

He would have seen developed from the product of his brain a new art, binding together the thoughts and actions of a nation for the welfare of all the people.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY AND ASSOCIATED COMPANIES



IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

Subscribe for the American Fruit Grower Magazine



3 Concord Grapes FREE

Everybody should have a few grape vines in the home garden. The Concord grape may be planted along the garden fence, near some building, on a trellis or elsewhere. Ripens in early August. Cluster and berry very large. Has an exquisite flavor, and is without question the most popular grape in the country.

OUR OFFER:

Send us \$1.00 for a three years now, renewal, or extension subscription to the AMERICAN FRUIT GROWER MAGAZINE and we will send you three Concord grapes absolutely free. Order now—shipment will be made at proper time for planting.

————— USE THIS COUPON —————

American Fruit Grower Magazine, 55 W. Jackson Blvd., Chicago. (Jan., '26)
I enclose \$1.00 for which send me the American Fruit Grower Magazine for three years and the three Concord grape vines, free.

Name

St. or R. F. D.

Town.....

State..... I have acres in fruit

Cash Accounts

A complete and accurate record of all cash transactions is necessary if cash accounts are to be useful. By "complete," I mean such a statement of the item as will be clear at any later date and showing the enterprise to which it should be assigned. This matter of entry is especially important if enterprise accounts are to be kept. A proper cash entry tells all that it will ever be necessary to know about the item. For example, an item like this, "Spray material, \$90.00," is practically useless in cost accounting because it does not tell what the material is, or how much there is of it, or the unit cost, and it cannot, therefore, be correctly apportioned to different orchards or fruits. It should read, "March 15, 500 gallons sulphur @ 18c, \$90.00." Additional records of amounts used in each operation are necessary for apportionment.

The Ledger

A question which will arise at once in a complete accounting system is whether to keep a cash book and later post to a ledger, or post directly to a ledger in the first place. My experience of nearly 25 years in account keeping tells me that for the small business, direct entry to the ledger is not only the simplest and easiest but sufficiently accurate. Where there are large numbers of items to be entered I prefer to use the cash book because of the greater certainty of getting all the items entered and because it facilitates getting monthly totals of receipts and expenses and balancing with the bank. Moreover the cash book is more easily used in a busy time, and with a good cash book ledger posting can be done at one's convenience.

In the ledger I open as many accounts as there are items and enterprises with which it is necessary or desirable to keep a separate record. Each account is given from two to four pages, according to probable size, and the pages indexed with gummed tabs so arranged that each account is easy to find. For example, our 1925 ledger accounts are: Real estate, labor, horses, equipment, automobile tractor, truck (so far these are all fact or cost finding items), cattle, hogs, poultry, chicks, sheep, apples, peaches, pears, plums, alfalfa, beans (etc., for several other crops), fall plowing, feed and supplies, lime, manure, outside labor, and farm personnel.

labor items. A grower may expend thousand dollars for two men's work during the year, but until this labor is correctly distributed among the enterprises on his farm, he will not be able to determine his cost of production. The purpose of labor records is to enable one to properly distribute labor.

The best unit for labor records is the hour. With adequate hour records cost rates are easily applied. Costs of labor as actually paid out will appear in the cash book and ledger. There must be a correct original record of how each day is spent by each man, each horse, and each piece of equipment as used. Since equipment is always used by men or horses the record of the use of equipment can best be made at the same time.

For convenience and accuracy then we must have a form or method of keeping labor records which will enable us to set down daily these items: Hours worked by men and by horses on each enterprise, the equipment used, the tractor hours, truck hours, and certain other labor facts. For this purpose either of two methods may be used: (1) a daily diary or specially ruled sheets, or (2) a labor ledger similar to the cash account ledger.

The chief advantages of the daily diary method are the ease with which the original record can be made, the accuracy and completeness of record possible, and the opportunity to add such special records as amounts of spray materials or fertilizers used, yields, etc. The big disadvantage of the diary is the fact that all its records have to be posted or entered in the enterprise account, or labor ledger, to summarize them, thus nearly doubling the time required to keep the record. An original record, too, must be kept for each man. I have used both methods and have come to think that the direct labor ledger is the simplest and best, especially for the operator grower employing but few men.

Using the labor ledger method, we open the same enterprise accounts as in the cash ledger. Each night the labor of all men and horses and the use of all equipment are entered in the accounts to which they are chargeable. On days when there are a good many different jobs or when extra men are employed, a note pad to summarize is useful if not necessary. A part page in the apple account might then look like this:

	Hours				
	Man	Horse	Labor	Truck	Tractor
May 25—Disking orchard—D					
Plowing around trees—D (walking plow)	8				
26—Apply 300 lbs. nitrate soda—A		10			
29—Spray Baldwin front west—D			2		
Etc.	8	16			

Rates and Overhead

Overhead costs constitute from one-tenth to one-third of total costs of production. To determine these definitely certain other records must be kept. Interest, taxes, insurance and repairs on buildings, general expenses not chargeable to any one specific enterprise, such as telephone, must be apportioned to the different farm enterprises if correct costs are to be obtained. This calls for records of the use of land and buildings. These should be listed as separate accounts in the cash accounts and debited and credited as items come up. The amount of gasoline used in the spray rig, tractor, truck, etc., must be recorded. One must put down the disposition of feed bought or grown and of manure hauled out on fields. These are all simple but necessary items to have properly recorded.

Conclusions

To summarize the enterprises and the farm operations as a whole, rates for the use of man and horse labor must first be computed by assembling total costs and dividing by total hours worked. Then equipment costs must be figured in the same way. These rates are then applied to the

hours already charged the different accounts. The totals for labor and equipment are carried from the labor book and entered in the cash book. Then after the overhead items are distributed we can soon know the loss or gain and the detailed unit costs.

These are the essentials of complete record keeping. They may be elaborated and many other facts deduced and items compared and analyzed as desired. The foundation for all cost studies and complete farm accounting are (1) the inventory; (2) the cash book or ledger; (3) the labor record; and (4) the overhead, cost rates per hour, and supplemental records of special items. For emphasis, let me repeat here the suggestion already given to avoid elaborate systems, begin with the simple and easy, stick to essentials and expand the system to meet needs.

Apple Storage

FOR 18 years the pomology section of the Iowa Agricultural Experiment Station at Ames has been investigating the control and prevention of apple storage diseases, and the fourth report of this work has just been published in the form of Bulletin No. 222, which may be secured by anyone interested who will address his inquiry to the Bulletin Section, Iowa Agricultural Experiment Station, Ames, Iowa.

This report, containing 64 pages, covers internal breakdown, apple scald, Jonathan-spot and soft-scald. It describes each of the diseases and reports what measures were found most effective in the control of each.

The investigations reported were carried on mainly with Jonathan and Grimes apples. It was found that apples of either variety should not be held after January 1, because Jonathan-spot is likely to affect Jonathan after that date and because of the danger of internal breakdown attacking Grimes.

Jonathan-spot was best controlled on Jonathan when they were picked before becoming too mature and stored immediately at about 32 degrees Fahrenheit and a relative humidity of 80 to 90 per cent was maintained. Although early picking reduced Jonathan-spot, it also increased soft-scald on Jonathan apples and the authors of the bulletin, H. H. Plagge and T. J. Maney, feel that more experimental work is necessary to determine the best picking date for Jonathan.

Jonathan-spot affects deeply red colored apples most and occurs on Rome Beauty, King David and Esopus as well as on Jonathan. It occurs as greenish tinge to blackish colored spots which range from one-sixteenth to one-fourth inch in diameter.

Apple scald on Grimes was best controlled by delaying the picking date and by wrapping the apples in oiled wraps, but here again internal breakdown was most extensive if picking was delayed too long. The best control methods for internal breakdown were to pick Grimes before they had become too mature and then to store them immediately.

Apple scald is said to be most likely to affect the Arkansas, Grimes, Rome Beauty, Sheriff, Yellow Newtown, York Imperial and Winesap varieties, and that the Willow Twig, Northern Spy, Jonathan, Missouri Pippin, and Ralls varieties are practically immune.

Draining Her Crankcase

Little Johnny, a city boy in the country for the first time, saw the milking of a cow.

"Now you know where the milk comes from, don't you?" he was asked.

"Sure!" replied Johnny. "You give her some breakfast food and water and then drain her crankcase." —Ez.

MAIL order houses are endeavoring to get the size of paper money reduced so that the bills will fit in ordinary envelopes without folding. This will reduce thievery in the mails, in their opinion, since folded bills are easier to detect in sealed envelopes than bills not folded. The proposal is said to be receiving serious consideration on the part of treasury officials.

Make Your Spring Spraying Effective it will insure full fruiting



The better the spray materials you use, the greater the crop your trees will yield—and the greater will be your year's profit. A sure way to insure sound fruit is to use

ORCHARD BRAND

Bordeaux Mixture Arsenate of Lead and other Insecticides and Fungicides

There is more than the well known name to distinguish Orchard Brand Products. There is a difference in material—a quality difference that makes it important for you to insist on Orchard Brand.

You say "Bordeaux" is Bordeaux regardless of who makes it. So it is—in name. If you measure it by what it does for your fruit crop, there are many different products under that same name. The safe kind to use is a factory-made product which is chemically balanced. Too much lime will burn the trees, and so will too much copper. And the home-made product is almost never exactly right. You can use Orchard Brand Bordeaux Mixture and do more effective spraying at a lower over-all cost. Ask for our 1926 folder and see where the saving lies.

Orchard Brand Arsenate of Lead occupies the same leading position. Its specifications exceed the government requirements—but that is not all. Our product contains a spreader which gives it a free flowing character beyond ordinary standards. You can cover the leaves and fruit more thoroughly while using less material. That quality with its other excellent characteristics should make it command your preference. Its use will be a real economy.

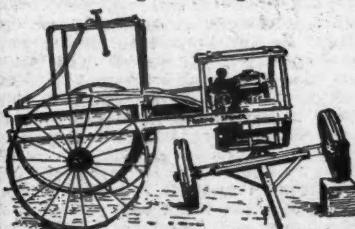
These and other Orchard Brand Insecticides and Fungicides are carried in stock by dealers in all fruit growing districts. If yours cannot supply you, write us direct.

GENERAL CHEMICAL COMPANY
NEW YORK ST. LOUIS SAN FRANCISCO LOS ANGELES



SPEND WISELY

Don't put your hard earned money into a sprayer until you have thoroughly investigated the sturdy and honestly built "Friend" and become acquainted with its exclusive, simple and serviceable features. Built on the principle of construction that gives lasting service.



Single unit motor pump; straight gear transmission, no belts, no chains; low down; short turn; large wheels—easy draft; adjust packing while pumping at high pressure are just a few of the many practical features that you'll appreciate.

Write at once for free Catalog.

"Friend" Manufacturing Co.
110 East Ave., Gasport, N.Y.

FREE! Beautiful Collection of GLADIOLA BULBS

with a subscription to
American Fruit Grower

We will send this collection of 10 superb gladiola bulbs FREE with every three-year subscription to the American Fruit Grower Magazine at the regular rate of \$1.00.



The Gladiola is the queen of all flowers. It is a wonderful cut flower—lasts two weeks in water—and starts blooming in early summer. They will grow and bloom for anyone in any soil and climate, and require but little care. Grows a long graceful spike, 18 to 20 flowers on a spike, and furnishes a wider range of color than most other flowers.

Order now. Shipment will be made at proper time for planting.

American Fruit Grower Magazine, (Jan., '25)
53 W. Jackson Blvd., Chicago.

Enclosed find \$1.00 for which send me the American Fruit Grower Magazine for three years and the collection of 10 choice gladiola bulbs, free.

Name

St. or R. F. D.

Town

State I have acres in fruit.

A 9-year prune test on the Blauer Ranch

FRENCH PRUNES are an important crop of the Blauer Corporation, at Saratoga, Calif. Quite natural, therefore, that they should conduct exhaustive study to determine the most efficient and effective fertilizer for prunes.

For nine years they experimented. These are the results:

One group of trees, left unfertilized as a check plot, yielded only 2,578 pounds of prunes. A second group of trees, receiving potash and phosphate, grew 3,200 pounds. And a third group, fertilized annually with a Sulphate of Ammonia, potash and superphosphate mixture in a 3-8-3 formula averaged 4,498 pounds per acre for nine years.

On a dollar-and-cents basis the trees receiving the Sulphate of Ammonia showed an average net gain of \$78.60 over the trees that received no Arcadian Sulphate.

No matter what crops you grow, you can get better results with Arcadian Sulphate of Ammonia. Try it at our expense. Let us send you a free sample of Arcadian Sulphate—enough to fertilize 25 square feet of soil. Mail the coupon.

Top-Dressing
Talk No. 2

ARCADIAN Sulphate of Ammonia

THE BARRETT COMPANY, AGRICULTURAL DEPARTMENT

New York, N.Y.

Atlanta, Georgia

Berkeley, Calif.

Medina, Ohio

THE BARRETT COMPANY (address nearest office)

Please send me sample package of Arcadian Sulphate of Ammonia.
I am especially interested in
(Write name of crops on line above)
and wish you to send me bulletins on these subjects.

Name

Address

A-2

Hayes Fruit Fog Sprayers Save All Your Crops

Coarse, low pressure sprays that drench your trees kill only the exposed pests, leaving the hidden pests to despoil your crop. Fruit Fog, produced by Hayes Power Sprayers, kills the pests that lurk in every tiny crack and recess and saves all your crop.

Fruit-Fog costs no more. A Hayes Power Sprayer will soon pay for itself in lowered spraying costs and bigger crops. 300 pounds guaranteed pressure breaks the solution up into a finely atomized, fog-like spray that blankets every tree. No waste, no time lost trying to reach the difficult places—Fruit-Fog filters in anywhere air can go. Requires less solution and does a better job.

Hayes Power Sprayers range in capacity from $3\frac{1}{2}$ to 16 gallons per minute. The small outfits are as efficient as our big Triplex models—all are readily accessible and are built according to the most approved design. Porcelain cylinders optional in all models.

Send for our sprayer catalog and check over the features of the Hayes Sprayer that fit your needs. Catalog sent free upon request. Write today.

HAYES PUMP & PLANTER CO.

Dept. 09 809 Sixth St. Galva, Ill.

Full line of power, traction and hand sprayers.



Ask about our new Tractor Driven Power Sprayer before you buy. Its lower operating and upkeep costs and increased efficiency will interest you. Information mailed promptly upon request.

Fruit Growing in the Southeast

By O. F. E. Winberg

Winter Spraying of Satsumas

THE SATSUMA production in south Alabama, north and west Florida, south Mississippi and southeastern Louisiana considerably exceeded our expectations earlier in the season. Considering express shipments, local sales in near-by towns and carlot shipments to northern, western and eastern markets, the present year's crop (the season of which is now at an end) amounts to approximately 400 carloads. Prices obtained this year have been eminently satisfactory and the net return to the growers will be the best since commercial production began in 1914.

One feature of this year's production is very gratifying. Approximately 65 per cent of the total production was classed as fancy fruit. This is an improvement over the average of previous years of over 35 per cent. This is primarily due to more intelligent care of orchards, particularly that of spraying for disease and insect pests.

With this satisfactory result, the growers should lose no time in preparing for next year. Now that the fruit has been removed from the trees, spraying should promptly commence, the most important of which at this time is for the control of scale insects, particularly purple and long scales, which are the most serious insect enemies the Satsuma orange grower has to contend with. Some growers who sprayed thoroughly had 85 per cent fancy fruit and 15 per cent of second grade or bright fruit, while others, who were indifferent in spraying, had 45 per cent fancy fruit, 35 per cent bright fruit and 20 per cent dull.

Since 1918 our best growers have used oil emulsion (government formula) in combating scale insects on Satsumas. This spray material has been constantly improved so that at the present time it gives a splendid uniform result, providing that the orchardist operating the spray machine exercises thoroughness. Of course, a good power sprayer is essential for the successful control of insect pests and diseases.

New spray materials are constantly being put on the market, and some

Satsuma growers have used these materials with unsatisfactory results, but still if another new preparation came on the market they would be willing to try it. Our advice is that the growers adhere to the standard oil emulsion (government formula) that has been tested out here in the Gulf Coast territory over a period of seven years and has given uniformly good results.

Winter spraying for Satsumas is of the utmost importance for the reason that if the trees are freed from insect pests during the winter, they are in a healthy condition when they begin new growth in the spring, and thus they are able to produce a more vigorous growth of foliage and naturally are able to set and retain more fruit because of the absence of parasites consuming the vitality of the tree. In winter spraying for Satsuma oranges, however, it should be borne in mind first, that the strength of oil emulsion should be greater than that used in the summer, one gallon to 40 gallons of water, and not less than one gallon to 50 gallons of water. The grower should be careful to see that the oil emulsion is fresh and that no separation has taken place. If it has separated (curdled) it will have the effect of burning the foliage.

Second, more than one spraying is necessary to get results. At least two during the winter should be made with a 30 to 40-day interval. If the second spraying follows too closely on the first, the result will be defoliation; therefore the necessity for the interval referred to above. Third, the orchardist should be careful and not spray during cold weather because if he does, defoliation takes

place. If possible, gauge the spraying operations so that low freezing temperature does not occur during the time spraying operations are going on or for the first few days after spraying has been done. While the defoliation of the Satsuma does not necessarily mean no crop, it means that the tree is producing blossoms and foliage at the same time, and this double function is more than the vitality of the tree can stand, and it necessarily follows that the shedding of young fruit is unusually large.

Fertilization of a Satsuma Orchard.

The first application of fertilizer should be applied during the month of February in order that there may be available plant food for the trees when they begin their new growth in the latter part of February or the first part of March. This first application of fertilizer should analyze 8-4-6, composed of eight per cent of phosphoric acid derived from acid phosphate; four per cent of ammonia, one per cent derived from nitrate of soda, one per cent from sulphate of potash and two per cent from animal tankage or fish guano; and six per cent of potash from sulphate of potash.

One-year-old trees should receive two pounds per tree the first application; two-year-old trees three pounds; three-year-old trees four pounds; four-year-old trees five pounds; five-year-old trees eight pounds; six-year-old trees 10 pounds; seven-year-old trees 12 pounds; eight-year-old trees 14 pounds; nine-year-old trees 16 pounds; and 10-year-old trees 20 pounds.

The second application should be applied the latter part of June or the first part of July. At that time the formula should be changed to 8-3-10, the eight per cent of phosphoric acid being derived from acid phosphate; two per cent of the ammonia being derived from nitrate of soda and one per cent from dried blood or fish guano; and 10 per cent of potash from sulphate of potash. The same amount per tree should be applied at that time as recommended for the first application.

Satsuma growers on the Gulf Coast have long since recognized the necessity for a liberal supply of plant food if they are going to have a good crop of good sized fruit and if the trees are going to produce new growth upon which to set fruit the following season. To economize on plant food is very poor economy, indeed.

Where an ample supply of plant food is given, and intensive cultivation and efficient control of pests and diseases are practiced, the tree may produce from three to six boxes per tree, while if the contrary method is practiced, it may produce from one to two boxes per tree, and then inferior quality fruit at that. The orchardist should insist upon his fertilizer being derived from materials indicated above or buy the raw materials and mix them himself. Fertilizer materials should be provided for in plenty of time. The month of January is the proper time for securing and getting the fertilizer ready for application in February.

The fertilizer should be distributed around the tree, from the tip of the branches outward two to three feet, and mixed in thoroughly with a spring-tooth harrow.

Now that the fruit has been harvested, whether legumes have been grown in the orchard during the summer or not, no time should be lost if plowing under the legumes or grass so that this material has a chance to decay during the winter, in order that when the tree begins to produce its first growth in the spring, the orchardist is ready to begin cultivation and continue intensive cultivation throughout the season up to August 1.

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T used
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Pinch Root of Prune Trees

By A. H. Hendrickson

University of California

THE MYROBALAN has long been used as one of the principal rootstocks for plum trees. Statistics gathered in California show that considerably over one-half of the plum trees propagated in that state are budded or grafted on Myrobalan root.

One point that seems to have been overlooked by propagators is that Myrobalan seedlings may vary as much as other seedlings. In the nursery row specimens of red leafed, thorny, upright, spreading, strong or weak growers may be found growing side by side. An examination of commercial samples of Myrobalan seed may also show a great many differences in this supposedly uniform species of fruit. The Myrobalan plum also varies in size and in color. Furthermore, seeds from different Myrobalan trees show variability in germination.

One of the most interesting variations in this type of rootstock was noticed several years ago. Prune trees after the first few years in the orchard showed lack of vigor. Investigation of the problem brought out the fact that the scion had outgrown the rootstock. Ordinarily, California growers do not consider this kind of growth as particularly dangerous, but in this case the trees did not overcome the trouble. After a few years there was a distinct bulge just above the graft union. The roots were not sufficiently nourished and many of the trees died. Sometimes trees lived until they attained the age of five or six years but in every case they were worthless as far as production was concerned. The term "pinch root" aptly describes the appearance of the root below the union. Most of the trees affected by this trouble were traced to one nursery, but the propagator was at a loss to account for it. Fortunately, this trouble seems to have been prevalent only on trees propagated on one lot of seedlings, and it has not been observed since that time. This condition is probably similar to a case observed by some of the older growers who recall the formation of pinch root on trees grafted on Myrobalan cuttings.

Pruning Pear Trees for Profit

(Continued from page 4.)

wise be tied down—no pruning being necessary. However, if the Caldwell system does not seem advisable, then proceed by:

2d. Select three main branches, as above directed, and cut these back moderately (one-third). Do no pruning

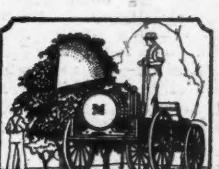
during the next three or four years, with the possible exception of taking out the worst suckers and water sprouts.

3. After the trees have started rather heavy production (two or three boxes per tree at five to seven years of age) by either of the above methods, some shaping can be done. This pruning will tend to admit light to the central parts and thus secure better fruiting throughout. Care must be exercised in this pruning that too much wood is not removed during any one season and that the proper balance between wood growth and fruit production is maintained.

The author feels that with young bearing pear trees (up to 10 or 12 years of age) 10 to 18 inches, and with older trees, six to 10 inches, of new growth is all that is necessary, and, in fact, desirable to maintain profitable production.

See California Agricultural Experiment Station Bulletin No. 386—"Pruning Bearing Deciduous Fruit Trees."

AMERICAN FRUIT GROWER MAGAZINE: Please renew my subscription with the October number, if possible, as I do not want to miss a number. I get a dollar's worth out of each number and would not be without the magazine for several times the subscription price.—J. B. Jordan, Kentucky.



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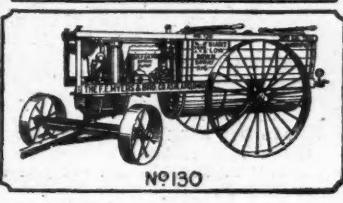
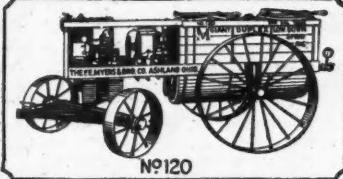
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Missouri Society Elects Officers

THE MISSOURI State Horticultural Society, which met in conjunction with the American Pomological Society and the Central States Horticultural Exposition, held a short separate session and elected the following officers: S. S. Connell, Faust, President; Byron Coleman, Marionville, First Vice-President; Fred Merrill, St. Joseph, Second Vice-President; Patterson Bain, Jr., Columbia, Secretary; W. J. Jacquin, Louisiana, Treasurer.

Mulching Plum Trees May Prevent Frozen Crop

MULCHING the plum trees after the ground is thoroughly frozen may save the plum crop from freezes late in the spring, says A. L. Ford, extension specialist in horticulture at South Dakota State College.

Ordinarily plums blossom too early in South Dakota. A mulch applied after freeze-up in the fall will keep them dormant for a longer period in the spring and may retard the bloom until after the critical frost period. This mulch should be applied for several feet around the base of the tree.

THE McINTOSH RED apple will be a favorite apple in the future in the belief of Will Anderson, prominent fruit grower of Brunswick, Mich. He bases his belief on the high percentage of marketable fruit produced by that variety.

In Mr. Anderson's orchard, from 117 baskets of tree run McIntosh only five baskets were sorted out as culms and all the remaining 112 bushels went into A-grade. Mr. Anderson believes there is no other variety which will produce such a high percentage of merchantable fruit.—H. L. Spooner, Michigan.

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The Orchard Home Department

By Mary Lee Adams

To Owe or Not to Owe?

THERE are few less exhilarating ways of spending money than making the interest payments on debts. Something tangible that we can see and touch is what we want for our hard-earned cash. But do we see in that inexorably recurring payment anything so delightful as a shiny car, a new costume or a pleasure enjoyed? Not at all, or if we get a glimpse of them, it is but as a teasing semblance of things we might have had were it not for that hateful interest.

The practical objection to debt is, of course, that it eats up the small income. Unless a debt is promptly discharged or regularly reduced, the debtor will in time pay out the total sum of the amount borrowed, without reducing the debt by a single penny.

This tends to discourage the stoutest heart. A shadow dogs the debtor's steps. A gnawing anxiety takes all the savor out of life. Yes, our minds are easier when we are out of debt.

But what about that crucial moment known as the knock of opportunity at the door? Many young married couples particularly have not the capital necessary to avail themselves of a good business opening. In such case it seems not only justifiable, but praiseworthy, to incur debt up to the amount one may reasonably expect to repay within a given time.

There's always risk. Unforeseen developments may take the profit out of a promising venture. It is this sobering thought that makes sensible men and women hesitate to enter into company with the demon debt.

Nothing venture, nothing have. Be brave but not foolhardy. Like matrimony debt is not to be entered into lightly or inadvisedly. If you decide to risk it, prepare to set the jaw a little more firmly and to keep in mind the definition of a worth while human being, "One who, when knocked down, refuses to stay down."

All Is Vanity

FOR WHOM do women dress? That's their secret. Sometimes it's a secret even from themselves. They really don't know just why they want to be adorned. The most cynical guess is that they do it to arouse the envy of others. That's seldom the case, though among the forty-seven reasons why women dress, it may well be a minor one.

Another guess is that they dress for other women. Well, I suppose they are more afraid of criticism on that score from their own sex. But let us remember that the most dressy occasions are certainly not "for women only."

If I were asked to list the objectives of women's dressing in the order of importance, I would begin something like this—Possible Lovers, Lovers, Husbands, the last running, as you see, a poor third. No special reason to blush, ladies, even if the cap fits. It's not purely a feminine weakness.

The psychology of men seems to fit fairly with your own in this particular. Their clothes are worn primarily to attract and impress women, and alas! as with women, the nearer the goal the less earnest their efforts to present an attractive appearance.

Before "The One and Only" appears, the appeal must be general. The apparel is designed to take the eye of most anyone. After a palpable hit has been made, there is less uneasiness over improving an acknowledged perfection. Once the noose is firmly drawn, over-confidence too often suggests that the beauty of heart and soul now being patent, there is no need to worry over merely surface qualifications.

The inaccuracy of this assumption, especially by women, has been pointed out so often and proved so frequently as to invite no further comment, save the pertinent, or impertinent question: "Who is guiltless in this regard?"

What married man or woman can cast the first stone?"

In all cases women dress for the spoken or imagined compliments on their appearance. It is so nice to be approved. If there is no one else to impress, a woman will dress to compliment herself.

Psychological Weaning

DOING mothers seldom think of the permanent injury they may be doing their children when they allow them to continue too long dependent upon maternal aid in all things. It's the easiest fault for a mother to fall into. From the first cry of the first baby, her whole heart goes out to the tiny, helpless creature whose existence for a time will depend solely upon her care.

If babies were less helpless they would be less unselfishly adored. Their strongest appeal to our tenderness is their inability to fend for themselves either mentally or physically. The warmest satisfaction a mother knows is the spontaneous turning of the little child to her in every least incident of its life.

It is hard to relinquish this complete possessiveness. It seems to the mother that in encouraging independence, she is allowing sort of separation to creep in between herself and her child. Surely, she thinks, Mother knows best. And the very best is what she ardently wishes for it. She would even breathe for it if that could save it an effort or a pang.

Naturally the youngest child is the longest kept a baby and is therefore more subjected to this prolonged, exaggerated care from the mother. Students of child nature assert that it is the youngest, the pet, the spoiled member of the family who is most apt to show a lack of that self-reliance which is essential to good all-round development.

The habit of dependence upon one stronger than themselves tends to become fixed. The character of the child leans on a crutch rather than showing the capacity to stand alone. The mother who would avoid weakening the moral fiber of her child must start before it is too late upon the process to which the name "psychological weaning" has been aptly given.

Hard Luck Stories

SOME hard luck stories are true, but the majority of them might be labeled, "How I paid for my carelessness." They are alibis for folly, for lack of alertness or application. There's plenty of real hard luck in the world, but there's a lot more negligence, wastefulness, laziness and irresolution.

Then, too, in common parlance, most people can't see what lies under their noses. Apples fell to the ground long before Sir Isaac Newton developed his theory of gravitation.

Far more than we realize, there is in most of us a lack of perception, a state of unreadiness to profit by the golden hints of fortune to which few give ear. Where one person will jog slowly along in the beaten track, another, no whit more capable save in observation, will discern a way of shortening the distance or of covering it more rapidly. The latter gets there first.

"So you wish to leave to get married, Mary. I hope you have considered the matter seriously."

"Oh, I have, mum. I've been to two fortune tellers and a clairvoyant, and looked in a sign-book, and dreamed on a lock of 's hair, and I've been to a medium and astrologist, and they all tell me to go ahead, mum. I ain't one to marry reckless like, mum."—London Opinion.

Wash and Be Clean

Not half so many baths are taken in the home where water must be carried in buckets. The hand pump in the yard came as the first relief from the painful lugging of pails from the spring. Various mechanical devices for pumping water followed. Some of these were difficult for a woman to operate, and it's awful to have to wait for water until there's a man around.

Electric pumps are the best answer so far to the question of how to get water into the rural home. One type refills the tank automatically as the water is drawn off.

Keeping Cool

And now think for a moment of the health and economy that may be found in an iceless refrigerator. Many country homes are far from the route of an ice wagon. Without some way of keeping milk, meat and other foodstuffs fresh, there is great waste and constant risk of illness from eating stale food. Milk for the baby alone would justify installing an iceless refrigerator.

Even the kitchen may be made a pleasant place by an electric exhaust fan that is set in the window and draws off the heat from the stove. As for the electric fans now so universally used in hospitals, offices and public buildings, the small sizes of these can make such a breezy place of home that hot days may be faced without fear of physical exhaustion.

Your Electrical Day

What a difference even the cheap devices make in your day. Morning and the cool night air still lingering in the bathroom. Just stick the plug of the electric heater into the wall, and immediately a warm, lovely glow permeates the room. One may dress in perfect comfort.

At the breakfast table, without leaving your seat, you may please the family by serving appetizing wafers, crisp toast, fragrant hot coffee, etc.

You may be going to a social gathering in the afternoon. Will you make yourself hideous all morning with curlers? By no means. Once more plug in, this time with the electric curler, and presto! you have curls. Curls, my dear! not the straggling ends that shock the eye and absolutely murder one's looks.

And how easy it is to keep clothes freshly pressed with the electric iron. Five minutes before starting for call or party you can smooth out those wrinkles that make any garment look as if it were on the verge of collapse. Indeed, electricity will clear the way for you to escape one of the most depressing features of the over-busy woman's life, the inability to take time to keep herself looking attractive.

Keep Warm, Keep Well

Bed-time, and the chilly sheets with nothing to warm them but your own shivering person. Not if the electric pad is at hand. Then, jumping between the sheets may be converted into a cozy pleasure.

In case of sickness these pads are as useful in cold weather as the sun is in summer. Many an illness could be either averted or made much less trying and severe by easily applied heat and cold.

One could chat of this and that about electricity in the home until year after next. Just keep it in mind and get it into the house. You will then have gone a long way toward securing a happy, healthy year.

Radio messages have now been broadcast by a deep sea diver from the floor of the ocean. The reception is said to have been perfect 100 miles away. More astounding still is the assurance that we shall soon see as well as hear over our radios. Football games, operas, church services will appear as we listen. This, says the inventor, will remove the last traces of that sense of isolation from which farming people once suffered so acutely.

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Finishes for Woodwork

By Gertrude Woodcock

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WOODWORK frames a room. Just as an inappropriate frame will destroy the effect of a picture, so poorly or inappropriately finished woodwork will alter the appearance of an otherwise attractive room. Many a housewife has scrubbed, cleaned and dusted, rearranged furniture, rehung curtains and even changed the color scheme of the walls in an effort to make things "look right" and found, to her sorrow, that the "wrong look" persisted. Nine times out of 10 it is the woodwork which is wrong. The room is "improperly framed" and no matter what the bewildered housewife does, it stubbornly resists all efforts to improve its appearance.

There are a number of unique and extraordinary finishes for wood which are appropriate for certain rooms in certain homes, but in general, wood trim in the average house is either painted, stained, varnished or shellacked. The point, then, is not how to get something "different" but how to finish the trim so that it is correct from all standpoints—appearance, durability and appropriateness.

Many Kinds of Wood Used as Trim

There are, in all, over 20 different kinds of wood in use today for interior trim. They vary from the commonest soft woods to rare grains from distant lands.

A number of them are admirably suited to a paint finish. White pine, birch, poplar, red gum, bass wood, soft maple, redwood, Douglas fir and white cedar are ideal for opaque finishes, that is, paints and enamels. The beauty of the harder grained woods lies, of course, in their markings. They should never, therefore, be finished with anything but transparent varnishes and stain. Oak, walnut, mahogany, chestnut, yellow pine and ash are some of the commoner "figured" woods.

In many parts of the country soft pine is cheaper than other woods, consequently many houses are trimmed with baseboards and moldings of that wood. Soft pine takes paint as well as any other wood, and the householder whose home is "framed" in pine has at his disposal any number of paint finishes that are charming and practical.

Of course, white, cream or ivory paint or enamel are most frequently used for finishing soft wood interior trim. These are usually in good taste and very practical, but frequent a little variation will be even more pleasing.

How Precedents Hang to Us

I am thinking as I write this of a farm house in a northern state where the wood trim throughout is a lovely shade of yellow verging on buff. It is an old house and the energetic young pair who live in it inherited it from the young man's parents.

"Yes," he replied, when I asked him how he happened to choose that color for his woodwork, "it is a little unusual, but it's always been that color, as long as I can remember. When I was a kid I can remember my mother deciding to paint it some other color, 'something darker' she said, 'so it won't show the dirt,' but when she looked over the painter's colors she couldn't find anything she liked as well."

"Yes," agreed his wife, "I thought I wanted to change when I first came here. I never heard of yellow wood-work before and wanted white enamel, like the magazine pictures show. I had one room done over. Before it was finished I stopped the painters and told them to make it yellow again. The house didn't look right that way and I couldn't stand it."

That was before it began to dawn on people that painted woodwork does not necessarily mean white woodwork. Nowadays some of the most attractive wood finishes are achieved with colored paint—nothing

more and nothing less. Gray is an excellent color for woodwork. If a room has plenty of sunlight and bright rugs or curtains containing a hint of gray, there is nothing more attractive. Gray-green is another color that has been successfully used. Shades of blue have also been used, and, of course, yellow, buff and tan.

Very beautiful effects have been obtained by using one coat only of flat paint, other than white, upon woodwork in certain rooms. It should be wiped across the grain and a transparent finish added.

This method retains the beauty of the growth of the wood and at the same time produces the proper tone quality required to carry out the painted surface of walls and ceiling.

A special finish that is well suited to bedrooms is known as polychrome ivory. This is done by first applying three coats of paint of dull or gloss finish. A stain or glaze is then applied and wiped. The success of the finish depends on the wiping, which is done with the grain. Turpentine stain should be wiped immediately. In any case, the wiping should remove as much stain as possible. Good colors for such work are greens, blues and yellows. The true old ivory effect is obtained by using raw sienna.

Stippled Finishes

Rich effects can be obtained by stippled finishes. These are best for living room woodwork. They are done by first applying three coats of ground color and then a thin glaze of contrasting color which is stippled with a large stencil brush. Good color combinations for this work are light buff ground with olive green glaze, venetian red ground with mahogany glaze, white ground with orange glaze, silver ground with blue-black glaze, ivory ground with raw sienna glaze. Because of the extreme thinness of the glaze color the durability of these finishes will be greatly increased if one coat of varnish is applied as soon as the glaze is thoroughly dry.

Three or four coats of paint for ordinary finishes are not too many, for they will last three times as long as "skimpy" finishes. When one goes to the trouble to refinish the interior woodwork it might as well be done properly at the beginning.

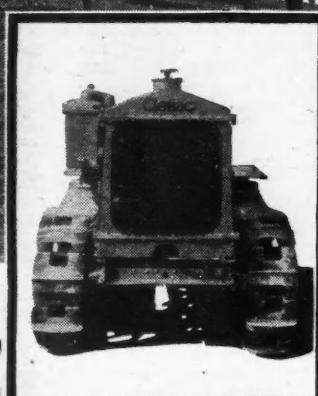
Transparent Finish for Hardwood Trim

If you are one of the lucky people who have hardwood trim, there are any number of unique and interesting finishes which may be used. Grained woods had best be treated with transparent varnish over stains so that the markings will not be obscured. Oak, walnut, mahogany, chestnut, yellow pine and ash all take transparent fillers and form very beautiful "frames" for a room.

One finish for hardwood is a weathered or silvered effect which is obtained by coating the wood with a light brown stain that has been grayed slightly by the addition of a black stain. As this dries very quickly it can be treated shortly to a coat of paste filler which has had either white or aluminum paint added to it in a generous quantity. After this has set for 30 minutes, the wood is wiped across the grain. After 12 hours the surface may be varnished or waxed and rubbed.

Several artistic effects are obtained on oak, for instance, by the use of a stain and contrasting colors in the filler. Good combinations are a dark mission oak stain with a filler tinted with venetian red, russet stain with white filler, golden oak stain with very dark blue filler, and olive green stain with neutral gray filler. These finishes are excellent for dining rooms, living rooms and hallways. Because the grain of the wood is not equally receptive to the colored filler, certain portions retain more of it than others. It is in this way that the interesting effects are secured.

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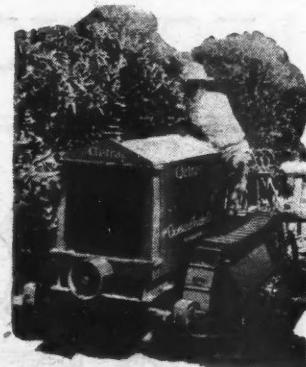
THE problem of orchard cultivating is solved—successfully—if you use a Cletrac "K." This powerful tractor—quality built throughout—can be depended upon under any cultivating conditions. It works close up to and under the trees—and turns within its own length—while its abundant traction and unusual pulling power make it the ideal tractor for work on steep grades and hillsides. Its broad tracks tread as lightly as a man's foot and never pack or harden soil around the trees.

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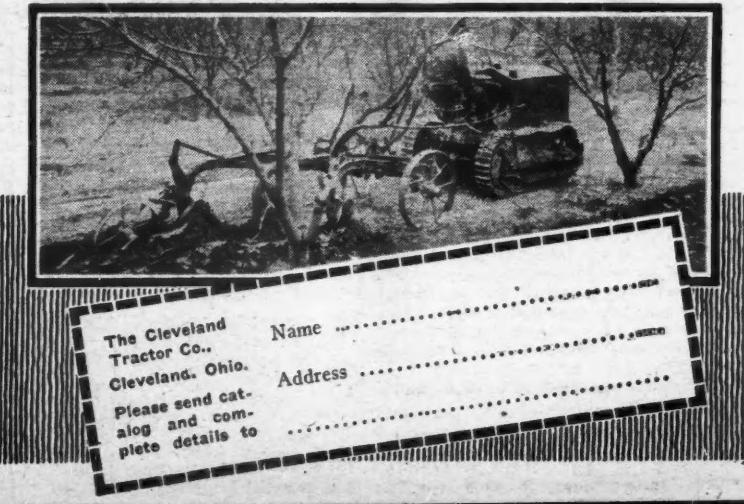
Exclusive Cletrac Advantages

Cletrac "K" is the only tractor made with an instantaneous oiling system! One push of the plunger and the lubrication is done without stopping the machine! A 15-25 H.P. unit specially built for heavy-duty service, its draw-bar pull practically equals its own weight—delivering approximately 90% power efficiency. A tremendous advantage that is an exclusive feature of the Cletrac "K."



For lower labor costs in the orchard—larger profits—greater satisfaction in orchard cultivating and downright dependable power delivery—choose the Cletrac "K". The coupon below brings you actual working views of this remarkable tractor—complete descriptive details—and prices. Mail it today—for greater economy in orchard work!

The Cleveland Tractor Company
Cleveland, Ohio





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CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL

Buying at "Sales"

"SEE THE pretty remnant of silk I bought today! It was on sale for only a dollar—such a bargain," exclaims Mrs. Shopper.

"What are you planning to make of it?" asks Mrs. Neighbor.

"Oh, I'm not just sure, but I'll be able to use it to trim something or other some day—I knew it would be useful and it was such a bargain," replies Mrs. Shopper.

Mrs. Shopper takes home her purchase, thinking busily all the while whether to trim a dress with her purple remnant, buy some velvet and brocade to put with it for a pillow, or combine it with something for a blouse. Finally she decides she doesn't need it right at present and puts it away in the cedar chest, consoling herself with "It'll come in handy some day." The chances are it will never be used, and then the dollar spent on the "bargain" will be so much money lost. Or worse still, she may spend hours combining it with another material in a dress only to find that purple is her most unbecoming color.

There are many women who buy useless articles because they are "on sale, and at such a bargain." They buy anything from red ribbon remnants to broken, second-hand furniture because they can "get it cheap."

Must Know Values

Sales are all right for the careful shopper who knows values and qualities, and will buy only the things she can actually use. She must know what the particular article is worth at the ordinary price in order to be sure there has been a price reduction for the sale. Many large department stores have girls whose main work is to mark prices on sale goods. The prices are put away up above and then marked down to a price which is still above the ordinary price in many cases. I was told this by a girl in my home city who did that sort of marking, so it is not merely hearsay.

To gain anything by buying on sale, the shopper must have in mind exactly what she needs in the quality she needs, and must know very nearly what that quality ought to be worth. It is a real economy to buy good-quality remnants for some particular purpose, such as a square of handsome velvet or brocade for a living room pillow, laces and pastelle colored ribbons for lingerie and hand-made flowers, or ginghams for aprons.

There are certain types of sales at which the shopper will be more likely to find some real bargains than at others. The January "white sales" usually afford some real "buys" in sheets, pillow cases, towels and bed-spreads. Some of them may be slightly shopworn and soiled from handling, but that will make no difference after the first washing—unless the stain should be permanent.

Another place where fine values are offered at a low figure is at the wooden mill or woolen mill store. You can usually buy blankets, sweaters, dress materials, and other woolen goods for less than at any other store. And you can be sure it is all wool, too, if it is a high class mill, as they don't buy anything but wool. By going out to the mills, you can often find blankets with slight imperfections in weave, really beautiful blankets, at considerably less than half price.

One-Cent Sales Good

The "one-cent sales" afford some real bargains, chiefly in stationery, drugs and toilet goods. Be sure to buy only needed things and then in

quantities you can readily use. At the one-cent sales you buy one article for a certain price, and can get another just like it for one penny more. But again you must know values.

All stores put out what they call "leaders" in their advertisements for sale day—something which is a real buy to attract the crowd (knowing the shoppers will stay and buy an armful of other junk). If you know their real worth, you can pick out these leaders and avail yourself of the opportunity, providing you need the article. When a store decides to close out a certain line or standard brand of merchandise, the last few articles of that type are usually sold at a very attractive figure. Furniture, sewing machines, washing machines, labor saving devices of all sorts, silverware and chinaware are most commonly offered at this type of sale.

The final admonition is to buy only from reliable firms who will stand back of their merchandise. And don't forget that in this world you get just exactly what you pay for (or less).

Breathe Fresh Air

DO YOU breathe fresh air? You probably insist on it during the summer when temperature and freshness of air are more closely related, but do you stop to think of the quality as well as the warmth of the air that you breathe in the winter months?

One health authority has made a statement that fully half the colds prevalent during the winter could be prevented if sufficient thought was given to ventilation. We are deeply concerned with the degree to which the air is heated, but its freshness often gives us little worry.

Of course, the type of house will determine the kind of provision that must be made for ventilation, but the important thing is to provide some means of replacing the stale air with fresh air. Most of the newer dwellings are built with that idea in mind, but many families have the problem to solve in older houses.

Screen Open Windows

The constant interchange of fresh and used air is the most desirable method, and this may be achieved by the use of small canvas window screens fitted into partially open windows. A living room occupied by three or four persons should have a window open, screened, of course, in severe weather, at least one inch for each person. The sleeping porch solves the fresh air problem nicely at night. If one is not available the bedroom windows can be left partially open at night with no discomfort in most climates. Put on another comforter to make up!

Windows opposite each other provide the best ventilation, for the current that is set up will move across the room and carry the heated air out with it. If this is not possible open the window at both top and bottom.

Some of the heating stoves will care for the outlet of stale air in a measure, but not entirely. The old-fashioned fireplace, while wasteful of fuel, insures a good circulation of air. When the house has no fireplace, some other means of ventilation must be provided.

Since heat and ventilation are closely related, they must always be considered together. Each living room should have in some place where the temperature is average, a thermometer which will give a better index of the temperature of the room than the

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sensations of any one occupant. A temperature of between 67 and 70 degrees will be best for most people.

Often a room will be considered cold if the air is too dry, because of the rapid evaporation from the skin. Some way of adding to the moisture content of the air will correct this. A pan of water, or a teakettle boiling on the stove will send enough moisture into the room, so that it will seem much warmer. There is an economic side as well, for it will result in a saving of fuel.

Let's have no more of stuffy, over-heated living rooms and sleeping rooms. Result—we will be a clearer thinking, more vigorous race.

Household Hints

Use Two Wringers

TWO WRINGERS are better than one. The farmer's wife who usually does all the family washing should have two wringers—one to be used between the two tubs and another for the washing machine. The one on the washing machine might be an older one, as the first wringing from the

soap suds is not so important as the later wringings. Loosen the wringer rolls after each washing, or they will get flat-sided.

Box for Dampened Clothes

HAVEN'T you often wished for a satisfactory place to keep clothes which have been sprinkled for ironing? A clothes basket does fairly well, if the housewife has one, but I have a friend who has solved the problem nicely. She selected a nice clean box, free from slivers and of the desired size, then she had Friend Hubby take the box apart, cover each board with white oilcloth and nail the box back together again. Now she has an ideal place for dampened clothes. The reason for taking the box apart to line it is that the oilcloth can be fitted much better in this way.

To Clean A Sieve Easily

PUT DRY salt on the sieve, rubbing it well into the mesh. Then rinse well. The sieve or strainer will be thoroughly cleaned.

Serving Winter Vegetables

WHEN you hear people say, "I don't like vegetables," you may be sure that the cook does not know how to prepare and serve them appetizingly. Vegetables, when properly cooked and well seasoned, never fail to win the approval of even the most critical. Most vegetables require a long slow cooking in boiling water to retain the flavor and make them tender without destroying the shape. Some seasonings, such as butter, cream, bits of bacon or ham, salt, pepper, sugar, vinegar, onions or spices, are necessary, without exception, in vegetable cookery to bring out flavor. The recipes given below are "type" recipes, so that the same recipe may be used for several other vegetables.

Mashed Turnip

Wash and pare turnips, cut in slices, cubes or quarters and cook in boiling salted water slowly until soft. Cook with out a cover in water to cover if the turnips are inclined to be strong-flavored. If mild-flavored, less water may be used, and thin boiled down toward the last. Drain, mash and season to taste with butter or cream, salt and pepper. Recipe serves equally good for other vegetables.

Creamed Turnip

Wash turnips and cut in $\frac{1}{4}$ -inch cubes. Cook 3 c. cubes in boiling salted water 20 minutes, or until soft. Drain and add 1 c. White Sauce II, or make the sauce right over the turnips by adding milk and thickening with flour and seasoning with 1 T. butter, salt and pepper. Recipe equally good for peas, carrots, parsnips and cauliflower.

White Sauce II

1 c. milk 2 T. butter
1 T. flour $\frac{1}{2}$ t. salt

Heat butter until melted, stir in flour and salt and stir until smooth. Add cold milk and cook 7 minutes. Stir constantly. Add dash of pepper if desired.

Turnip Croquettes

Wash, pare and cut in quarters tender, white turnips. Steam until tender, mash, pressing out all water possible. (Best done by wringing in cheesecloth.) Season with salt and pepper, then add yolks of 4 eggs slightly beaten. Cool, shape in small cones, dip in crumbs, egg and crumbs again, fry in deep hot fat, and drain. Serve hot with white or brown sauce.

Scalloped Tomatoes

Remove contents from one can tomatoes and drain off some of the liquid. Season with salt, pepper, a few drops of onion juice and sugar, if preferred sweet. Cover bottom of buttered baking dish with buttered bread crumbs, cover with tomatoes, and sprinkle top thickly with buttered crumbs. Bake in a hot oven until crumbs are brown and tomatoes heated all through.

Stewed Tomatoes

Place can of tomatoes in sauce pan, heat slowly, and season with salt, pepper, butter and sugar. Add pieces of cracker or dry toast.

Carrots and Peas

Wash, scrape and cut carrots in small cubes or strips, cook until tender in boiling salted water or stock from meat. Drain, add an equal quantity of cooked peas, season with butter, salt and pepper and heat thoroughly. White Sauce II may be poured over instead of the butter and seasonings, if desired.

Buttered Parsnips

Wash, pare and quarter parsnips. Cook in a small amount of boiling salted water slowly until tender. Drain or boil down water, turn parsnips into skillet in which 4 T. butter have been melted. Brown slowly on one side and turn, being careful not to break pieces. Season with pepper and serve hot. Recipe serves for carrots also.

Parsnip Fritters

Wash parsnips and cook 45 minutes in boiling salted water. Drain, plunge in cold water and rub off skins. Mash, sea-

son with butter, salt and pepper and shape in small flat cakes. Roll in flour and fry in butter or bacon fat. Salsify or oyster plant fritters may be made in the same way.

Creamed Onions

Remove skins from small onions, put in a sauceman and boil in boiling salted water for 5 minutes, drain and again cover with boiling salted water. Cook until soft, but not broken. Drain and add milk and seasonings, or pour over White Sauce II. For scalloped onions, place cooked onions in baking dish, cover with White Sauce II, sprinkle with buttered cracker crumbs and place in hot oven to brown crumbs.

Corn a la Southern

To 1 c. chopped corn add 2 eggs slightly beaten, 1 t. salt, $\frac{1}{2}$ t. pepper, 1/2 T. melted butter and 1 pt. scalped milk; turn into a buttered pudding dish and bake in a slow oven until firm.

Tomato Sauce

To a pint of tomato puree (put can of tomatoes through a sieve) add a small onion cut fine, salt, pepper and paprika, a few grains cayenne, a small bay leaf, dash of cloves, 3 T. vinegar (more vinegar if necessary for flavor), brown sugar to suit taste, and bits of green pepper cut fine. Cook slowly until onion and green pepper are tender. Tomato sauce can best be made only by constant tasting and the addition of flavorings accordingly. It is excellent for Spanish steak, Spanish rice, with spaghetti or macaroni, or as a sauce for fish.

Spinach

Remove roots of spinach, pick over, discarding wilted leaves, and wash in several waters. Put in a stewpan, allow to heat gradually and boil 25 minutes or until tender in its own juices. Drain thoroughly, chop finely, reheat, and season with butter, salt and pepper. Mound on a serving dish and garnish with slices of hard-boiled eggs and toast points. Serve with a few drops of vinegar. Other greens, such as beets, turnips and dandelions, may be served in the same way, but they require a small amount of water in cooking. A bit of bacon fat or ham added in the cooking will improve the flavor of greens.

Stuffed Peppers

Select as many nicely shaped green peppers as you need servings. Cut a slice from the end of each and remove seeds. Cook small onion, sliced, in butter three minutes; add bits of ham and brown, or left-over meats from roasts of veal, beef or chicken chopped fine; add 1 c. tomato puree, 3 T. bread crumbs and season with salt and pepper to taste. Cook slowly till blended. Cool mixture and fill peppers, cover with buttered bread crumbs and bake till peppers are tender. Serve hot with tomato sauce. Fresh tomatoes and par-boiled onions may be stuffed in the same way.

Table of Equivalents

- 1 T. equals 1 tablespoon.
- 1 t. equals 1 teaspoon.
- 1 c. equals 1 cupful.
- 1 pt. equals 1 pint.
- 1 qt. equals 1 quart.

All measures are level.

How much a Wagonload?

You can drive to town to get a load of coal, and carry back enough to last you for some time. But you cannot load electric power onto a wagon and bring it home.

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You cannot get electric service by the truck-load. If electric service is to come to you, it must be sold in such a quantity and at such a price as will pay the cost of its delivery, as well as the cost of producing it.

How electric service can be sold in such quantity and at such a price as will be mutually beneficial to farmers and electric light and power companies is one of the problems now being studied by fifteen state committees working with the national committee. The Committee on the Relation of Electricity to Agriculture is composed of

economists and engineers representing the United States Departments of Agriculture, Commerce and the Interior, American Farm Bureau Federation, National Grange, American Society of Agricultural Engineers, Farm Lighting Manufacturing Association and the National Electric Light Association.

If you are interested in this work, write for a booklet describing it.

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By E. W. Lehmann

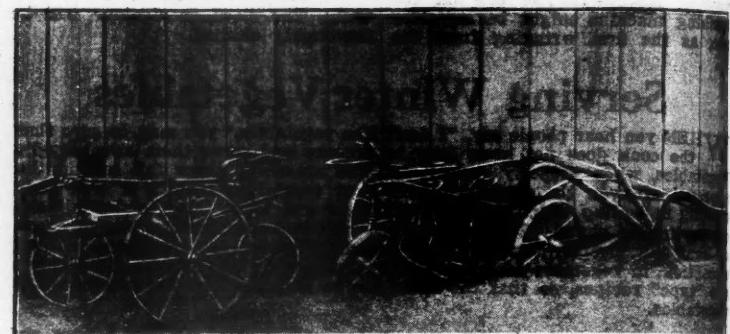
Value of a Farm Shop

THE CHIEF value of a farm shop is its value as a time saver for the farmer. It must not be overlooked, however, that a shop when not properly used may develop into a time waster. While a large per cent of the farmer's work is of a mechanical nature, the farmer must be careful not to devote too much of his time to being a mechanic. His job should be devoted to the task of operating equipment and he should not devote too much time to fixing and devising equipment.

From the standpoint of a busy farmer, a shop may be of greatest value in an emergency. In slack sea-

other equipment, boys who expect to be farmers should be encouraged to study the machinery used on the farm with the idea of becoming more proficient in handling it. There is a great waste on many farms due to neglected machinery. Many boys now have the opportunity to study farm mechanics in the high school. The general subject of farm mechanics might well be substituted for manual training in many high schools where a large per cent of the boys are from the farm. The writer will be glad to advise with any high school teacher as to subject matter for such a course.

In recent years there have been



An example of valuable machinery exposed to the weather. Neglect of this kind results in inefficiency and increases cost of production

sons the shop may also be a means of reducing repair bills. The farmer with a certain amount of mechanical ability and proper shop equipment can plan ahead and get all machines in first-class shape for field work. The decreasing number of country blacksmiths and general repairmen and the increasing number of high-priced mechanics and specialists, have made it necessary for farmers to make themselves familiar with methods of making repairs and to become more efficient in the use of all types of equipment.

A Better Farmer Because He Can Make Repairs

There is no question but that the farmer who has sufficient skill to do the repair work and ordinary construction work and can operate efficiently and keep in adjustment the more complicated machines now used on the farm, can carry on the business of farming more economically, more efficiently, with less loss of time and labor, and with greater satisfaction than if he must employ a high-priced mechanic for every construction job.

A certain amount of shop equipment should be provided on every farm, and every farm boy should be given the opportunity to handle tools and get that confidence and skill so necessary in the execution of a job. Too many farmers will not attempt a simple job, not because they lack ability, but because they do not have confidence.

This is an excellent time of the year to consider the shop jobs that need to be done on the farm. Some important machines may have been neglected when the field work was completed; if so, by all means get these in shape. Thoroughly clean the power sprayer, and replace new parts that may be needed. Free the engine of carbon, and grind the valves, clean out the carburetor, and see that the magneto is in good shape. Sharpen all tools and make new singletrees and eveners. Special hitches, such as recommended by the state agricultural experiment stations, for reducing side draft may be constructed. Get a rope bulletin and let the boys splice the ropes, fix the ends so they will not unravel, make halters, etc.

As farming and fruit growing become more mechanical, with their tractors, trucks, power sprayers, and

many short courses on farm mechanics subjects given by state colleges, agricultural extension workers, and manufacturers. The gas engine and tractor courses have been the most popular. In these short courses boys and men without previous experience have been taught to repair tractors by actually repairing them. Such courses should be taken advantage of whenever possible because the facts learned may be put into practice in the farm shop and result in a saving of both time and money.

Over-Equipped Fruit Farms

E VERY fruit grower might well ask himself the question, "Am I operating my farm inefficiently due to a lack of equipment or do I have too much overhead in the form of an investment in machinery and equipment for my particular business?" The solution quite obviously is to expand the business if there is an excess of labor and equipment. In other words, the real problem may not be a problem of over equipment, but a problem of too little land or too small an orchard. I like to think of the solution of the problem in this light because our greatest progress in agriculture as far as production per person is concerned has been due mainly to expansion. It is logical from an economic standpoint that this expansion should not go beyond the point where the labor and machinery available can handle the business efficiently and economically.

A Wrong Point of View

A student came into my office a few days ago to show me some data he had collected bearing on the status of equipment on a number of farms. He made the remark, "One thing I want to prove is that a number of these farms are over-equipped." I asked him, "Why do you want to prove these farms are over-equipped? If they are over-equipped would you advocate that some of the equipment be sold? If a farm has more labor and more equipment than necessary for a particular area of land, isn't the problem one of lack of sufficient land rather than too much equipment?"

When he attempted to answer

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these questions he began to realize that inefficiency in production is due to a lack of balance between the three items: amount of land available to be farmed, the equipment available, and the power and labor available; and that often the lack of adequate land or too small an orchard is the determining factor in production to maintain a high standard of living.

As an example, a 40-acre farm may be highly productive and it may have the proper amount of equipment for that area; in fact, no mechanical power driven tools may be used, but the income per worker may not be sufficient to maintain a high standard of living. Before modern equipment was available, an area of this size may have been a proper economic unit, but with improved machines the farmer can farm a larger area. With the continued improvement in machinery, the amount of orchard one man can handle will no doubt continue to increase.

Farms Over-Equipped Along Certain Lines

No one will doubt the statement that there are many farms that are over-equipped along certain lines at least. This does not have to be proved. The fact that some tractor owners have the time to plow for their neighbors after doing their own work, and the owners of power sprayers have the time to spray their neighbors' orchards, is evidence of this. Doing custom work is not a satisfactory solution. The problem is one of expansion or of co-operative ownership. It is generally recognized in this day and age that the farmer who uses the methods and equipment of 25 years ago cannot compete in production with the farmer who uses the best equipment available. It is just as important that the fruit grower have the best spraying equipment available to meet the competition in production as it is for the grain farmer to have the best grain harvesting machinery. A farmer may find it good business to spend several thousand dollars for a machine that will result in a better job done, or in a saving in the cost of production.

The Value of Electricity that Cannot be Measured by Dollars

IF THE development of every piece of equipment or device used in the home or on the farm was hinged entirely on its economic value, progress would be hampered. This is especially true of the use of electricity on the farm. The greatest demand for electricity on the farm at the present time is for those uses in the home where the value is more correctly measured in improved living conditions and satisfied home life rather than a greater monetary income or less expense outlay.

Lighting is the first application of electricity demanded by the farmer. It would be difficult to prove that electric light costs less than kerosene, but its value in taking away the dirty chores of cleaning and trimming kerosene lamps, and its value in ridding the farm of the fire danger of oil lamps, would be hard to estimate. The value of good lighting in protecting the eyesight cannot be measured. Poor lights often cause near-sightedness in children which affects their progress throughout their lifetime.

Electrically operated washing machines and water systems save labor and safeguard the health of the family. All of these things make life easier and more pleasant, and the value cannot be measured by the net earnings, but by a degree of satisfaction not felt when everything is hard and the beauty of life is neglected.

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(Jan. '26)

Fruit Growing on Canadian Prairies

By E. L. Chicanot

IN 1924 the Carter medal of the Canadian Horticultural Council, awarded annually to the individual who in its consideration has wrought the most for the advancement of Canadian horticulture, was voted to the family of the late A. P. Stevenson, of Morden, Manitoba, in recognition of his work in establishing the first productive apple orchard in the Prairie Provinces and his lifelong efforts towards the promotion of horticulture in that area. This was the first official recognition of horticulture in the broad prairie area. It was an acknowledgment on the part of the highest Canadian authority of the arrival of the provinces of Manitoba, Saskatchewan and Alberta at a certain definite status in fruit growing.

The tardy progress of the Canadian Prairies in fruit growing has been attributable, in the main, to two causes. The first was the tendency of prairie farmers to engage in the larger phases of agriculture, such as cattle rearing and grain growing. Apples have been raised in Manitoba as far north as Dauphin. The descendant crab and the red and yellow Siberian thrive much farther north or Jan

is successfully followed, it is possible to grow a considerable range of fruits in sufficient quantity to supply the house table throughout the year."

Variety Question Important

The preliminary difficulties encountered in the production of fruits in this wide area were along the lines of discovering varieties adapted to the northern climate and local conditions and evolving them where they did not exist. This investigation and experimentation was the work carried out by Stevenson and other pioneers, as well as the Dominion government. This phase of the work is over now and there is a mass of information, reliable and substantiated, available to the Canadian prairie farmer.

At the present time there are many apple orchards throughout the Prairie Provinces, and it was no unusual thing for Stevenson's orchard to harvest 300 bushels of luscious fruit. Apples have been raised in Manitoba as far north as Dauphin. The descendant crab and the red and yellow Siberian thrive much farther north or



Plums grown in Saskatchewan

that fruit could not be grown in the climate of that area. This persisted in spite of the prolific growth of wild berries all over the prairie area as far north as 500 miles from the international boundary.

Growing Interest in Intensive Agriculture

The Canadian Prairie West is only beginning to evidence a tendency to get away from this idea of immensity in farming, and to take advantage of the work of a few enthusiasts such as Stevenson who, convinced that there was no logical reason why fruit should not be produced on prairie farms, went ahead and proved that a farmer on such land could grow all his own requirements. This has resulted in bringing about a situation which is in itself very gratifying but which has a much greater bearing on farming in the Prairie Provinces.

Though the era of fruit production on the Canadian prairies is but opening, there is considerable fruit of wide variety grown there today for local needs. In fact, the first Dominion-wide survey of fruit production conducted by the Canadian government last year credited the Prairie Provinces with a commercial production of over \$30,000, comprising apples, pears, plums, strawberries, raspberries and grapes.

Canadian prairie fruit growing on anything like a definite commercial scale originated in the Morden district of Manitoba, where a great deal has been accomplished. The superintendent of the government experimental farm there is responsible for the statement that "In any place in Prairie Canada where wheat growing

west than this, and crabapples are grown successfully all over the prairie area. Nearly a hundred varieties of standard apples and many unnamed varieties are being tried out at the experimental farm at Morden. No prairie farm need now be without its apple orchard.

Plums and Small Fruits Successful

Plums can be grown successfully on most parts of the prairie. Trees six years old have yielded two pails per tree. Excellent results have been achieved from the sandberry, which has been crossed with the plum. Another fruit, largely imported into Canada, which thrives on the prairie, is the cranberry, and this might become a profitable industry with the thousands of miniature swamps, the natural home of the fruit, upon the homesteads of the prairie. Melons grow excellently in many districts of the prairie, particularly in the irrigated section of southern Alberta. There seems to be no limit to the northern production of strawberries and raspberries, and excellent fruit is produced in the Peace River country north of Edmonton.

Not much has been heard about prairie fruit growing, and as far as production is concerned, it is yet an insignificant state. But a great and valuable work has been accomplished, and the Prairie Provinces stand at the opening of a new era. The Prairie West has just about settled down to a definitely established status as a proven farming area, and farmers are increasingly arriving at a place where they can devote some attention to horticulture and other phases of farming. The



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situation is ready for them, with experiment and investigation successfully concluded and a mass of information and advice at their disposal. It is not suggested that the Prairie Provinces will ever be a great commercially producing fruit area, but it will come about, to a greater extent each year, that the Canadian prairies will raise most of the fruits for their own use.

Iowa Society Meeting

THE IOWA State Horticultural Society is a federation of the various horticultural associations of the state. It includes the Iowa Fruit Growers' Association, the Iowa Vegetable Growers' Association, the Iowa Beekeepers' Association, the Iowa Nurserymen's Association, and several others. Joint meetings of these organizations are held each year.

At the convention recently held in Des Moines, the Iowa Fruit Growers' Association elected the following officers: President, R. M. Clark, Mitchellville; Vice-President, George Koch, Des Moines; Secretary-Treasurer, R. S. Herrick, Des Moines.

Prof. T. J. Talbert of Missouri gave an interesting talk on oil emulsions, and Dr. C. C. Wiggins of Kansas discussed winter injury. Other leading authorities handled various subjects.

A committee on grades and standards, appointed a year ago, was continued. The members were strongly of the view that Iowa needs a law covering this matter, and they also desire that standardization and inspection service be instituted by the state at the earliest opportunity.

Washington Horticulturists Meet

THE WESTERN Washington Horticultural Association held one of the best meetings in its history on December 3-5 at Bellingham. There was an excellent attendance, and keen interest was displayed in the valuable program arranged by the officers.

The addresses covered a wide variety of subjects. There was particular interest in a paper by M. J. Forse of Seattle describing a new bait for the strawberry root weevil, also in a paper on cold packing or freezing of berries in barrels, by H. C. Diehl of the United States Department of Agriculture. The following officers were elected: Stephen J. Harmeling, Vashon, President; George Maloney, Firwood, First Vice-President; John Roberts, Seattle, Second Vice-President; H. D. Locklin, Puyallup; Secretary; Charles W. Orton, Sumner, Treasurer.

Windjammer

"WINDJAMMER" is the name applied to a machine used in California which is claimed by some to raise the temperature of an orchard by the simple process of mixing the air during critical periods.

The United States Bureau of Markets has been conducting frost service work in California since 1917. It has tested out this apparatus thoroughly, as well as many other contrivances. The windjammer machine cannot be recommended for complete protection from low temperatures as a result of these tests. The small orchard heater is the only machine which is recommended for raising the temperature of the air near the ground in order to protect the fruit from frost damage.

Origin of the Grapefruit

THERE has been considerable speculation as to the origin of the grapefruit. Dr. H. H. Hume of the Glen St. Mary Nurseries, Glen St. Mary, Fla., has given much time to the subject and he believes that the grapefruit is of American origin. It appears that a Captain Shaddock introduced the Shaddock into the Barbados Islands in the seventeenth century. Since the Shaddock and the grapefruit are closely related, the grapefruit is likely a mutant or sport from the Shaddock.

No record has been found of the

occurrence of grapefruit in the Far East, the original home of all other citrus fruits.

The grapefruit was grown in Florida for many years before the fruit was used for food purposes to any considerable extent. The late Mrs. Potter Palmer of Chicago has been given credit for sponsoring grapefruit as a table food. However, many other northern people who owned citrus groves in Florida discovered the edible properties of grapefruit and were probably using the same as early as Mrs. Palmer.

There are now a large number of varieties of grapefruit being grown, but only a few of them are valuable from a commercial standpoint.

Initials on Fruit

By Alice Crowell Hoffman

A PLEASING gift is a basket of apples, pears or plums bearing the initials of the recipient. Such a gift excites curiosity, it is novel and pleasing, and it shows forethought on the part of the giver.

To letter fruit, paste initials cut from paper on the apples, pears or plums, as the case may be, when full grown but not yet turned color. Be sure to paste the letters on the side of the fruit on which the sun shines most directly, for it is the sun that does the printing:

When the rest of the surface of the fruit has changed to its ripened color, the part under the paper initials will still remain greenish-yellow. Upon removal of the paper letters the initials will be found plainly printed on the fruit.

It is well to cut several extra letters exactly the same size and shape as those pasted on the fruit in the first place. Then, in case heavy rains remove the letters, others can be pasted on.

Ground Your Grape**Trellis**

THE EXPERIENCE of A. L. Cottrill of De Funiak Springs, Fla., the past season suggests the desirability of grounding wire used for grape trellis. Lightning struck a post near the end of a row and running along the wires



Effect of Lightning on Grapevines

The row on the left was injured by lightning which struck a post near the far end and ran down the wires. Grounding would probably have prevented this injury.

it killed or badly injured all the plants in the row. The accompanying picture shows the appearance of this row in August as compared with the appearance of a row adjoining. In all probability such injury as this can be prevented by grounding the wires at both ends of the row and possibly also in the middle if the rows are long.

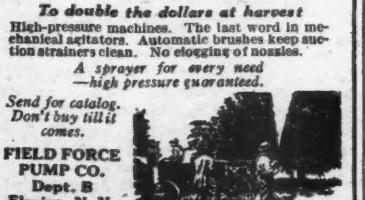
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Gold ground, 12 ft., Bridal wreath, 12 ft., Rose roses, 12 ft., Rose roses, 12 ft., 20 ft., 25 ft., 30 ft., 35 ft., 40 ft., 45 ft., 50 ft., 55 ft., 60 ft., 65 ft., 70 ft., 75 ft., 80 ft., 85 ft., 90 ft., 95 ft., 100 ft., 105 ft., 110 ft., 115 ft., 120 ft., 125 ft., 130 ft., 135 ft., 140 ft., 145 ft., 150 ft., 155 ft., 160 ft., 165 ft., 170 ft., 175 ft., 180 ft., 185 ft., 190 ft., 195 ft., 200 ft., 205 ft., 210 ft., 215 ft., 220 ft., 225 ft., 230 ft., 235 ft., 240 ft., 245 ft., 250 ft., 255 ft., 260 ft., 265 ft., 270 ft., 275 ft., 280 ft., 285 ft., 290 ft., 295 ft., 300 ft., 305 ft., 310 ft., 315 ft., 320 ft., 325 ft., 330 ft., 335 ft., 340 ft., 345 ft., 350 ft., 355 ft., 360 ft., 365 ft., 370 ft., 375 ft., 380 ft., 385 ft., 390 ft., 395 ft., 400 ft., 405 ft., 410 ft., 415 ft., 420 ft., 425 ft., 430 ft., 435 ft., 440 ft., 445 ft., 450 ft., 455 ft., 460 ft., 465 ft., 470 ft., 475 ft., 480 ft., 485 ft., 490 ft., 495 ft., 500 ft., 505 ft., 510 ft., 515 ft., 520 ft., 525 ft., 530 ft., 535 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frigerators are made in sizes that take 22, 44 and 80 one-quart boxes of the fruit, the 80-quart container being the most widely used. These containers are made of wood, are very durable, and are returned time after time during the same season, and are used from season to season.

With their aid, berries in small lots are sent to such distant cities as New York, Denver, and even San Francisco, arriving in excellent condition and at such times of the year as to bring high prices. The chests are equipped with pans for ice. The quarts of strawberries are placed in rows on each side of the ice box partition that divides the chest into two parts. When the required number of quarts are put in, a larger ice pan is placed directly above the fruit. Into this tray is placed as many as 260 pounds of ice, sufficient quantity to last for a five-days' journey. A heavy lid is screwed on, and the box is then ready to travel to the distant markets. As the ice melts, the water does not run down on the fruit, but is taken care of by special vents that carry it off through the bottom of the novel chest.

Extent of Shipments

Berries are also shipped in carload lots, in which case 24-quart crates are used. In 1924 the shipments out of Plant City totaled 820 carloads of express shipments in the "pony" refrigerators and 320 refrigerator carloads. The following authentic figures, compiled for berries that left Plant City alone and not including shipments from other south Florida points, will give an idea of the size and importance of the crop:

	Total quarts.	Average returns.	Average price per quart.
Oct.-22.	4,989,368	\$1,069,076.12	\$0.215
Nov.-24.	3,024,122	\$98,259.80	.28
Dec.-25.	3,939,910	1,047,706.74	.28

This table shows only the berries sent out from Plant City. Dover, Kathleen, Durant, Turkey Creek, and a score of other places also make berry shipments. Outside of Plant City, growers band themselves together into associations and ship their berries in carload lots, sometimes combining them but more often selling them to buyers as is done in other berry producing points.

There is no such thing as "average return" per acre in Florida. What a grower makes depends largely on his ability as a horticulturist, the adaptability of his land for strawberries and the condition of the markets when he is at peak pickings. Sometimes he makes more than a dollar a quart for early pickings; the average, though, is much lower, being 28 cents for the just season, as the table shows. Some men make as high as \$1000 an acre, clear of expenses, save that of their own labor. A grower who does all the work about his acreage, raising and setting his own plants, is usually not satisfied unless his net returns amount to \$500 and upwards per acre. Of course, there are many acres that do not pay anything like this return.

Taking it all in all and from year to year, the industry is a stable one. It is seldom that intelligent, hard-working growers have failed during the last 12 years, during which time the berry industry at Plant City has made its greatest strides to secure a fair return, and some years they have made "big money." Usually a grower need not depend entirely on his strawberries for an income. Berries can be followed by truck crops, such as tomatoes, and even by corn, which, sold as early roasting ears, is usually a paying second crop. Often strawberries are just one activity of a Florida fruit and vegetable farm, being perhaps the major activity.

Nectarines Deserve Greater Popularity

NECTARINES deserve to be more popular, according to horticulturists of the New York Agricultural Experiment Station. They are practically peaches without the fuzz. This alone ought to make them more popular with people to whom the fuzz is offensive. Nectarines are quite popu-

lar in Europe, and their popularity seems to be increasing in America. The New York horticulturists recommend that nectarines be grown more extensively, both on a commercial and amateur basis.

It is believed that nectarines will prove particularly popular in roadside markets. The better varieties cannot be surpassed for quality and flavor, whether used for dessert and cooking or eaten out of the hand. Only four standard varieties are worth trying in New York and probably in many other states. These are Boston, Elring, Newton and Victoria.

The Geneva station is searching for new varieties that may prove of increased usefulness. A new seedling called "Hunter" is being offered growers with the assurance that it is the best mid-season variety available. It has large, roundish fruit, yellow in color, mottled and blushed, with a yellow flesh, juicy, fine-grained, tender, sweet, and sprightly. It is a free-stone. A limited amount of stock is available to interested growers from the New York State Fruit Testing Association, Geneva, N. Y. The association propagates new varieties of fruit developed by the station and distributes the stock of the new sorts practically at cost of production.

Arsenic for Killing Trees

THE FOLLOWING directions for killing trees with arsenic are taken from the *Australia Forestry Journal*:

Formula

Arsenic, one pound.
Washing soda, one pound.
Whiting, one-half pound.
Water, four gallons.

Dissolve the soda in a small amount of water. Mix the arsenic with a little water to form a paste and add to the soda, stirring continuously. Boil the mixture for at least half an hour, avoiding inhaling the fumes which, being poisonous, sometimes cause sickness. Mix the whiting with the rest of the water and add after removing from the fire.

The best results are obtained by applying the arsenic in the winter, although trees may be killed at any season of the year.

Application

Make a series of overlapping axe cuts completely around the tree, through the bark and well into the tree. Leave the chips on to form a "frill." Pour from one-half pint to a quart or more of the arsenic mixture into the cuts, saturating thoroughly. An old teapot is convenient to use in applying the poison. Small trees may be cut off low down and the cut swabbed with poison. This effectively prevents suckering.

This poison has a salty taste and stock should be kept away until the rains have washed it all off the trees.

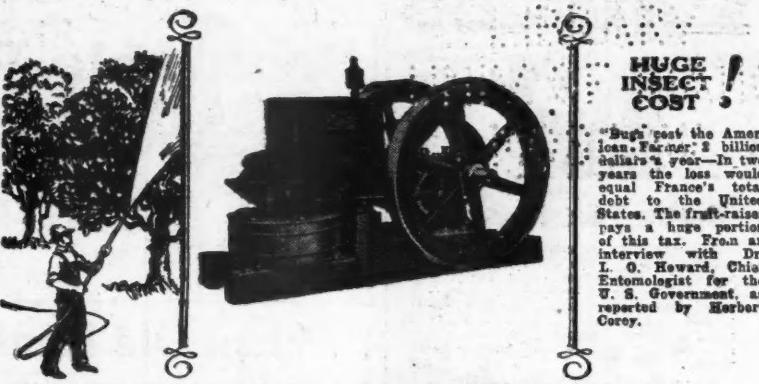
DURING 1924-25 the agricultural experiment stations of the United States were conducting 5538 projects, or an average of 110 per station. Some of these projects can be finished in one year, but others require several years for their completion.

Projects dealing with field crops lead in number, totaling 1817. Horticultural projects were second in number, totaling 952. Of these, 400 dealt with orchard fruits, 275 with vegetables, 65 with ornamentals, and 50 with nuts. Among the fruit projects, apples lead with 115 projects, and there were 45 projects with peaches and 135 with small fruits.

There were 926 projects in animal production, 482 in plant pathology, and 472 in economic entomology.

Besides the above projects conducted at the state stations, the Department of Agriculture also maintains stations in Alaska, Hawaii, Porto Rico, Guam and the Virgin Islands, where a total of 150 projects are in progress.

It is now the fashion for ladies to have the rims of their spectacles colored to match their frocks. Rimless glasses would go very well with evening dress.—*Humorist (London)*.



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—the WITTE is sure of performance under any weather condition or when drenched by the spraying fluid.

WITTE Engines come in all sizes, 2 to 25 Horse-Power, and insure you dependable power under any and all conditions.

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SPRAY YOUR FRUIT TREES AND VINES

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Stahl's Excelsior Spraying Outfit

Prepared Mixtures

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Profitable Poultry



By H. A. Bittenbender

When Old Hens Are Profitable

WHEN and under what conditions are old hens profitable and to what extent should our flock consist of them?

While the egg production of pullets is higher, as a rule, than that of old hens, old hens may possess qualities desired as to be profitable to keep them over several years.

Common sense tells us that a chick can be no larger than the egg from which it hatches. A small egg produces a small chick, and the larger the egg the bigger the chick. Naturally a bigger, more vigorous chick is to be preferred over a smaller one.

Hens lay larger eggs than pullets, which hatch bigger and stronger chicks. Chicks making a normal rate of growth will, at the end of 12 weeks, weigh 25 times as much as they did at hatching time. Every additional fraction of an ounce at hatching time will result in a bigger, more vigorous 12-weeks-old chick. The importance of strong, vigorous chicks cannot be over-estimated.

Fortunately, feeds such as milk, mash, green food and minerals, that produce winter eggs, also help in producing good hatching eggs. These feeds should always be provided, as they result in two-fold profits—good winter egg production and hatchable eggs.

There is another important reason for using hens' eggs for hatching. Pullets that have laid heavily all winter have been drawing on their body reserve to a greater or less extent, depending on the feed. Hens that are taking a rest during the winter are storing up a reserve and under similar methods of feeding can be depended on to produce stronger, more vigorous chicks than pullets. Eggs from pullets may hatch well, but larger and more vigorous chicks are hatched from hen eggs.

Selection of Breeders

The first quality that makes for success and profit in the poultry flock is vigor, vitality or constitution. Choose your own name for this quality. We care not which of the three you use, if you will only learn to pick out and keep such birds. The lower the flock is in vitality, vigor or constitution, the lower will be the profits and the higher the mortality of loss of birds. The more attention you pay to these three qualities the quicker will you find your flock on a paying basis.

Nothing is more discouraging than to start with a bunch of small, weak, puny chickens. Many are so weak that regardless of care or feed they will make little or no growth and can be depended on to develop into an unprofitable bird when mature.

One experience with chicks from old hens will convince the most skeptical person that they are the most profitable and satisfactory.

On farms where little attention is paid to breeding and feeding for good egg production, vigorous culling would eliminate from 70 to 85 per cent of the pullets during their first year of laying. Even in flocks where special effort is made to increase the egg production, it is seldom we find a flock but what 50 per cent of the birds can be culled the first laying year, with profit to the owner.

To replace from one-half to four-fifths of our laying flock each year is an economic waste, and one of the surest ways of avoiding this big replacement is to breed only from old hens that carry over profitable eggs.

will then have started on a plan, which, if followed to the second and third years, will reflect an increase both in egg production and longevity of the progeny.

If you are not already doing so, start banding hens that are still laying November 1 or have recently molted and next year use them as breeders. If you have but few such birds, use them as breeders the following year. Within a short time the number of hens that lay all through the summer and fall will have increased and you can then raise all your chicks from old hens.

Speaking in a general way, hens two and three years old that show vigor and vitality and still possess good handling qualities are worth their weight in gold. Whether in saving eggs from your own flock or buying eggs for setting, a conservative estimate is that one egg from a hen that holds good egg production during her second and third year is worth two from untried pullets.

Old hens, properly selected for the qualities we desire, such as winter egg production, persistent production, and good handling qualities, will give us bigger and better chicks that will carry on. When properly handled, there is nothing on the farm that will show the relative profit over feed cost that can be expected from pullets from such desirable hens.

When chicks from such parentage are produced, don't make a mistake and raise them with the old hens and in the same yard you have had the chickens running on for years, for unless you are living on a gravel knoll nothing but disappointment will await you. Start with chicks from good eggs and keep them growing by raising your chicks on fresh ground.

THE VIRGINIA Department of Horticulture conducted a campaign last spring to promote more orchard cultivation. As a result, many orchards were cultivated. Because of this cultivation, the peach orchards in a number of instances withstood the drought successfully and produced a fair-sized crop of peaches. They also made a satisfactory wood growth and set a good crop of fruit buds for next year's crop.

In view of this experience, the station is recommending orchard cultivation very strongly for next season. Fall or winter plowing is recommended for orchards in which the soil will not wash. Other orchards should be plowed in the early spring and cultivated until about mid-summer.

According to the station, fall plowing has the following advantages:

1. Where land has been plowed in the fall it can be worked earlier in the spring, not only because the operation of plowing is out of the way, but because plowed land will dry out more quickly. It is always desirable to get the soil in good condition and to push the trees as early in the season as possible. Fall plowing is particularly desirable on rather heavy soils, because it is so late in the spring before they are in proper condition to be plowed.

2. There is less work for teams in the fall than spring. Many times teams are idle at this season and it is one method of helping to solve the problem.

3. Fall plowing destroys many insects which winter over in the soil. Fall plowing has in many instances proved its worth from the standpoint of disease and insect pest control alone.

4. Diseased leaves which are turned under will not be a source of infection for the new leaves when they come out in the spring.

Apple scab passes the winter on old leaves and if they can be disposed of it will aid materially in producing clean fruit.

Turning leaves under also adds humus to the soil which would otherwise be lost.

The California farmers who plant their fruit trees alongside the road evidently do not want the girls who walk home to starve to death.

Book Review

Fruit Growing

"**FRUIT GROWING**" is the title of a new 777-page book recently issued by the Houghton Mifflin Company of New York. The author, W. H. Chandler, is well-known to American fruit growers. He was formerly head of the department of horticulture at Cornell University. At present he is Professor of Pomology at the University of California. Thus he has had experience in two of the leading fruit states in the country.

The book treats the subject in a broad way. It is written from the standpoint of fundamentals rather than from the standpoint of the different kinds of fruit. The chapters all have to do with fundamental subjects, there being no separate chapters on apples, peaches, pears, etc.

Under the various chapters the important factors concerning the different kinds of fruits are covered. Thus a study of the book will give one a knowledge of the culture of the different fruits, presented from the standpoint of the principles involved.

The author apparently did a great deal of reading and investigation in preparing this book. Summaries of important investigations are given throughout the book and references are given in each case. The book should prove extremely valuable to students in fruit growing, to horticultural investigators, and to growers who wish to make a thorough study of the fundamentals in fruit growing.

Essentials of Systematic Pomology

A NEW book on the "Essentials of Systematic Pomology" by Prof. Brooks D. Drain of the Massachusetts Agricultural College, has just been published by John Wiley and Sons of New York. The price of the book is \$2.75.

The book treats the fundamentals of variety identification of various fruits and nuts. It begins with a brief account of the early history of the subject. The principles of variety identification are then described from the standpoint of the fruit, the characteristics of the tree, and the leaves. Separate chapters treat the identification of all our common delicious fruits and nuts. Chapters on the development of new varieties and fruit judging are also included.

The book seems to be logically arranged and the language is simple and readily understood. The subject appears to be well covered, yet the book is not a large one, containing only 284 pages. The book will undoubtedly prove valuable to all persons interested in varieties and variety identification and to students in systematic pomology.

Home and Farm Food Preservation

PROF. W. V. CRUESS of the University of California, well-known authority on the canning, drying and preservation of fruit products, has recently revised his book on "Home and Farm Food Preservation." The new book will undoubtedly be well received and it will bring a lot of valuable and useful information to those interested in home preservation of foods.

The book is divided into three principal sections, including the "Theory of Food Preservation," "Methods of Food Preservation," and "Food Preservation Recipes." Thus the book treats in logical order the principles underlying the preservation of foods, and it also gives definite information regarding the handling of the different foods. The book treats the entire subject of handling foods in a broad way and gives information pertaining to fruits, vegetables, meats and milk products. The handling of fruits and vegetables has received particular at-

tention. The book includes directions for canning, preserving, drying, dehydrating, the making of fruit juices, vinegar, jellies, marmalades, syrups, jams, butters, pastes, preserves and candied fruits.

The book should be a valuable help to persons interested in the subject, particularly from a home standpoint. The book may be purchased from the Macmillan Company of New York.

Systematic Pomology

"**SYSTEMATIC POMOLOGY**" is the title of a new book written by Dr. U. P. Hedrick of the New York Agricultural Experiment Station. Dr. Hedrick is well known to readers of the magazine because of the many excellent articles of his that have appeared in the magazine. He is the senior author of the books on fruit varieties, except apples, which have been prepared by the New York Agricultural Experiment Station. These are the most monumental works of their kind in existence. Dr. Hedrick's long experience in variety work fits him admirably for writing a book on systematic pomology. It is doubtful if there is any other man alive today who is so well qualified to write such a book.

The book treats the more common fruits only. In several introductory chapters it takes up the principles of classification with reference to different parts of the plants, including the roots, stems, buds, leaves, flowers and fruits. Following this, chapters are included which treat the different kinds of fruits by classes.

The book will prove an invaluable guide to all persons interested in the classification of varieties and types of fruits. It should prove especially valuable to fruit judges, students, and teachers of systematic pomology. The book is sold by the Macmillan Company of New York for \$4.

Manual of Vegetable Garden Pests

IN SOME of the older books, such subjects as the insects and diseases of agricultural crops in general were all treated under one pair of covers. So much information has been accumulated that it is impossible to treat such subjects in the same manner today. There is now a distinct tendency to treat certain specialized branches of agriculture in separate books.

A book of this kind is the "Manual of Vegetable Garden Diseases," written by Charles Chupp of the New York (Cornell) State College of Agriculture. The book includes no general chapters but takes up each of the vegetable crops in alphabetical order and discusses the diseases which affect them, giving symptoms, description of the causal organism, methods of control, and references. While references to some worth while pieces of work have been omitted, the book is probably as complete and thorough as could reasonably be expected of any book. It ought to be a valuable book for practical growers, students, teachers and investigators. The book is sold by the Macmillan Company of New York for \$4.

Fruit Auction Information

A 32-PAGE booklet has recently been issued by the Fruit Auction Company of New York. The book describes the methods used in selling fruit by auction, with particular reference to the New York market. It shows the various channels of distribution for fruits and vegetables; it explains the duties of receivers; it gives a bird's-eye view of lower New York City, with location of piers, prominent buildings, etc.; it explains the various steps employed in selling by auction; and it gives information which will help shippers in handling their products when selling by auction.

This book will prove worth while

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Which Do You Prefer?

These apple trees (1 yr. top, 2 yr. root) were over 4 ft. in height, but were cut back to about 30 inches. Most planters would cut off even more top after transplanting.

If you bought them by height both trees would command the same price. But the tree at the right is 9/16 inch up measuring the trunk two inches above the ground, while that at the left is 5/16 to 7/16.

This difference between buying by diameter rather than by height applies also to two-year apple and other fruit trees.

We grade and sell our trees by diameter. They are noted for excellent roots, uniform sturdy trunks, and vitality. They are giving "Growing Satisfaction" in nearly every state, in England, Ireland, Mexico, and other distant places.

Write for free catalog. Ask for ornamental folder if interested in beautifying your grounds.

"Your for Growing Satisfaction"

NEOSHO NURSERIES

126 Bird Street, Neosho, Missouri

Rejuvenation of Fruit Trees

(Continued from page 3.)

California, Bordeaux paste is used for the wood part, with a fringe of grafting wax around the wound to protect the cambium. In other parts of the country any material that is durable, sticks well and does not injure the cambium may be used. Both asphaltum and Oronite (a roofing paint) are employed. White lead mixed with linseed oil is sometimes used.

It is always hazardous to make large wounds on peach and sour cherry trees, as they heal slowly and with great difficulty. Peach trees almost invariably die from the top because of open wounds. Peach trees especially should be well opened up when young so it will never be necessary to remove large branches.

Fertilizing and Pruning

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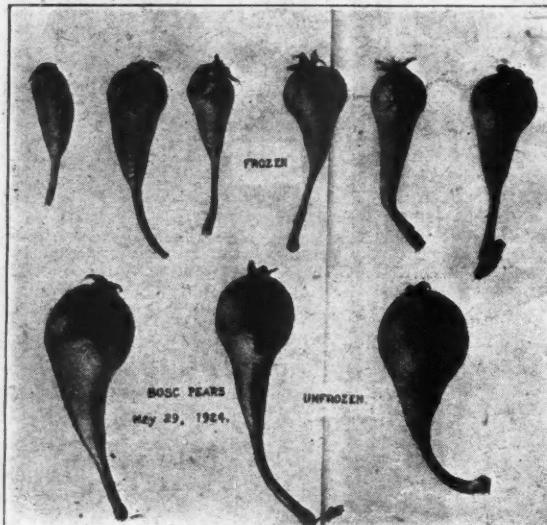
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Fighting Jack Frost

(Continued from page 5.)

half an orchard properly than to try to heat the whole orchard in a half-way manner. In the Rogue River Valley from two to three pots in each intersection of the tree rows are used, and just enough pots are lighted to maintain the temperature desired. Where trees are planted 70 to the acre, this will give from 150 to 220 pots per acre. Many nights only 20 to 40 pots per acre are lighted, depending upon the night. This number of pots will raise the temperature from one to two degrees. On colder nights from 50 to 100 pots will be lighted, and with this number burning, the temperature can be raised as much as seven degrees. In this district, this type of smudge pot will burn from two to three hours. On nights when it is necessary to be-

enter into the matter of killing temperatures, such as humidity, duration of temperature, condition of trees, and many other factors. In other words, fruit may stand a minimum temperature one night of 26 or 27 degrees, and not be damaged materially, while the next night a temperature of 28 or 29 degrees, where the duration has been for two to four hours, has resulted in a complete loss of crop. Again, in firing an orchard, one must not watch the thermometer when it is standing at 28 or 29 degrees for several hours, and think that the crop will pull through. When the temperature falls below 30 degrees, and there is any chance of it staying there for an hour or more, the best advice is to begin firing and keep the temperature above 30 degrees. Light just enough pots to raise the temperature and hold it. It is a good plan to have one thermometer to about each five to 10 acres, and they must be watched constantly, and firing must be done according to the grower's own feelings. Thermometers used in orchard heating should be sheltered overhead and on the back side by a 12 by 18-inch board on top and the same for the back. Face the thermometer toward the north; this is important and should not be neglected. Torches holding about one gallon of fluid are generally used. A mixture of one-half distillate of gasoline and one-half kerosene will light pots quickly and safely.



Frozen and unfrozen fruit after an April frost. The damaged fruits often hang until June or later, and some of them reach maturity but are second class

gin firing between 12 and two o'clock, it will be necessary to light two batteries or more. In other words, the first lighting will burn out around three or four o'clock, and another set of pots is lighted to carry through to morning. It has been found that frost usually comes for two or three nights in succession, and it is a good thing to have some oil carried over in the pots for the second night's work, because many times it is difficult to refill all the pots during the day.

Cost of Equipment

The cost of equipping the average orchard in this district is approximately \$60 per acre; \$50 for pots and \$10 for the cost of torches, thermometers, supply and storage tanks, and other incidentals. It is difficult to state the labor cost, as it will vary in different orchards, but ordinarily one man can take care of five acres.

One of the most important factors in orchard heating in the past, which has been abused by many orchardists, is that of accurate thermometers. Too much stress cannot be laid upon this point, and it is extremely important that the orchard owner should provide himself with accurate thermometers that can be easily read at night. The growers of the Rogue River Valley are now using special thermometers manufactured especially for orchard heating, with a scale running from zero to 70 degrees above zero. This makes it possible for a wider space between degrees, and such thermometers may be read to a quarter of a degree with ease.

Methods of Rogue River Valley

The frost work of the Rogue River Valley section is confined to the spring of the year, usually just before blossoming time, through blossoming and up until the fruit is about one-half inch or more in diameter. Damaging temperatures range from 30 degrees and lower. Most of the firing is done at 28 degrees. However, many factors

Rejuvenation of Old Fruit Trees

(Continued from page 41.)

and one of the scientists in an agricultural institution in Barcelona said there was no doubt but what these trees were 1000 years old and possibly 2000.

I have looked with care in many of the Mediterranean countries where civilization is very ancient, to find out how they handled their old orchards. However, to my surprise, I found very few of what we would call extremely old trees. They do not have them any more than we do in this country. Whether they cannot prevent them from dying off or do not regard the old ones as being worth saving, I cannot say. In the Island of Majorca where the land has been under cultivation for over 3000 years, and where almonds have been grown for centuries, I never saw a tree that I would rate as being more than 75 years old. We have numerous almond trees in California between 50 and 60 years of age, but many of them look like they were good for another half century.

Since it seems impossible to settle the question as to how long we may expect trees to live, the most practical thing we can do is to take them as we find them, and when they seem to be growing old, simply admit to ourselves that senile decay is about to set in and take measures to revive them.

Foreman—"Here, now, Kelly, what about carrying some more bricks?"

Kelly—"I ain't feeling well, guy'nor; I'm trembling all over."

Foreman—"Well, then, lend a hand with the sieve."—Ex.

BeeKeeping for Fruit Growers



By H. F. Wilson

Treating Foulbrood Combs in the Winter

IT WOULD be very difficult indeed to estimate correctly the losses caused each year by American foulbrood, but we may safely say that it is in the hundreds of thousands of dollars. The losses may be classified as follows:

1. The loss of surplus crops due to this lack of bees.
2. The cost of labor involved in treating diseased colonies and destroying the combs.
3. The cost of foundation and frames destroyed in getting rid of the disease.

Until a few years ago there was no way to save either extracted or brood combs from diseased colonies, and all that could be done was to melt them into wax. However, with the development of the alcohol formalin solution by Mr. Hutzelm, a means has been provided whereby the beekeeper can save the brood combs as well as extracting frames, and the loss is thereby considerably reduced. In the consideration of treating the combs from diseased colonies, the beekeeper should give very careful consideration to the cost of treatment and the possible net returns.

The Hutzelm solution will absolutely destroy the disease germs of American foulbrood, and when properly treated, these combs are safe to put back on healthy colonies of bees. But, in the process of treating disease-bearing combs, the beekeeper must be extremely careful not to scatter honey about so that the bees can get hold of it and carry it into healthy colonies and thus spread the infection.

If a beekeeper has 10 or more colonies of bees and finds only one diseased colony in his yard, it will pay him to destroy that colony immediately rather than try to save the honey and the combs, because, invariably, during the process of treating, infected honey is exposed to other colonies. Also, careless handling of the diseased honey in the honey house may cause it to be smeared on clean frames and when these frames are put back into the hives next spring, the disease will spread into new colonies. If a beekeeper has a large number of diseased colonies and his frames have become mixed so that he does not know which are clean and which are not, it will pay him to treat with the alcohol formalin solution. The method of treatment is simple, and considering the value of the combs, the cost is not high, although many of our beekeepers have a feeling that such is the case. It is true that the value of brood combs is figured at 25 cents each by some beekeepers, but a well drawn comb, drawn out on a full sheet of foundation, cannot be secured for less than a dollar's worth of frame, foundation and effort on the part of the bees to build. Treatment with the Hutzelm solution should not exceed five or six cents per comb, which is a very low cost.

Preparation of Combs for Treatment

Now, we will suppose that we have several hundred brood and extracting frames have been held over from diseased colonies of last summer. First, we will take the extracting frames, go over each of these very carefully and see that every cell is uncapped and open. Then soak these in ordinary cold water for from 24 to 48 hours, or until all of the honey which may be left in these combs after extracting

has been dissolved out. Remove from the water, place in an extractor, throw out the water left in the cells, and allow the combs to dry thoroughly. When dry, put them into the alcohol formalin solution for 48 hours. They should then be removed and run through an extractor to throw out the alcohol formalin solution. In this latter process, get the frames as free of the solution as possible in order not to waste material. After the combs are treated, stack them away in a dry, warm place if possible. Be careful to see that they do not come in contact with uncleaned equipment that has been used in connection with the diseased colonies.

In treating the brood combs, go over each comb carefully, as in the case of the extracting frames, and see that every cell containing honey is uncapped and open. Extract as much honey as possible before treating and then handle the same as for the extracting frames. It is unnecessary to open up cells containing dead brood as the solution will penetrate through the brood cappings and destroy the germs in cells containing dead larvae.

Tanks for Treating

Any kind of a metal tank with the proper dimensions can be used for treating the combs. A number of satisfactory containers may be made by using old second-hand honey cans, the top of which should be removed, and a half of another five gallon can be soldered onto the top so as to hold sufficient liquid to cover the frames, stood on end in these cans.

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After treatment, the formalin solution should be stored away in tightly corked containers and may be used as often as needed by simply adding additional amounts of the solution, sufficient to cover the frames in the treating tanks.

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During the process of selecting combs for treatment, a beekeeper will find it profitable to melt up his poor combs and render them into wax. Poor combs are those that are broken in any way or that are not filled out to the edges of the frames. Combs which contain more than 10 per cent drone cells should not be used in the brood chamber, and if they contain more than 25 per cent of drone comb, they should be discarded, since such combs will prove unprofitable for brood rearing.

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"He says: 'Go slow with the butter, kids; 60 cents a pound,'" replied the youngster.—Ex.

These Splendid 4-Year Top-Worked Stark's Golden Delicious Trees Bear 4 Bushels Apples Each!

WM. HOTALING, the well-known Broome Co., NEW YORK, orchardist casts his

I am sending you a photo, (see Photo below at right) of my Stark's Golden Delicious trees and fruit. These trees show 4-years' growth and they averaged 4 bushels to the tree this Fall!

"Stark's Golden Delicious apples are 100 per cent better than Grimes Golden in every respect! This is from my own actual experience from trees of both varieties grown side by side and under identical conditions. The difference in size of the Golden Delicious apples and the Grimes Golden apples—which difference is over 100 per cent in favor of Stark's Golden Delicious—alone would exclude Grimes Golden from consideration!"

Success of Golden Delicious Sweeping Entire Nation

Withstood 35 Below in Dakota

Bore in 2nd Year in Indiana

Here's proof of the amazing hardiness of this great variety. W. A. SIMMONS, recognized as one of SOUTH DAKOTA'S most famous fruit authorities, wrote us recently:—"Last winter, we had 35 below, with almost bare ground. My Stark's Golden Delicious came through without the loss of a branch—blossomed and bore as usual."

S. M. HOTCHKISS, Jackson Co., INDIANA, reports:—"My 3-year-old Stark's Golden Delicious bore when 2 years old and bore again this year when other varieties failed because of frost. Best variety I ever saw. No disease, bloom late and are absolutely hardy. Every one of my 3000 Stark trees is a perfect picture."

This great yellow apple is unquestionably the most exquisitely delicious and radiantly beautiful yellow apple ever produced. It is an exclusive Stark Introduction.

It averages about 50 per cent larger than Grimes Golden—immeasurably better in flavor—and much superior in keeping quality—keeps 4 months longer. Its crisp, tender, creamy-yellow flesh possesses a spicy aromatic flavor, savoring of a particularly choice pear—saturated with spicy-honey juice.

The trees that bear these apples are hardy and amazingly productive. They bore crops in 33 different States when 2 years old.

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That tells all about Stark's Golden Delicious and, also, the Sensational NEW Improved Delicious apple called STARKING. Our NEW 1926 FRUIT YEAR BOOK will lay before you an amazing volume of authentic information, beautifully and copiously adorned with over 600 4-color and 2-color illustrations. Use coupon and get this free book.

2 Splendid Grape Vines

This is our wonderfully attractive 1926 offer to induce early orders. Write for full particulars.

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5 Seeds of Stark's Blight-Resister Tomato

Just check Free Seed Square and Seeds will come to you immediately. Also, get Big, Beautiful 1926 Vegetable and Flower Seed Catalog—full of offers of NEW, BETTER VEGETABLES and NEW, DIFFERENT FLOWERS. Send Coupon at once.

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- Send Me FREE NEW 1926 FRUIT BOOK describing STARKING, Stark's Golden Delicious and tell me about your 2 Free Grape Vine Offer.
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- Send Me LATEST PRICE INFORMATION on Shrubs, Ornamentals and Free Landscape Plans.
- Send Me 5 STARK'S "BLIGHT-RESISTER" TOMATO SEED—FREE.

I may plant.....

(State kind and number)

Fruit Trees this Spring

Name

St. or R. R. No.

P. O.

State

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Healthful, Pleasant Work. Many of
our men make
\$3500 and more—
write for terms.

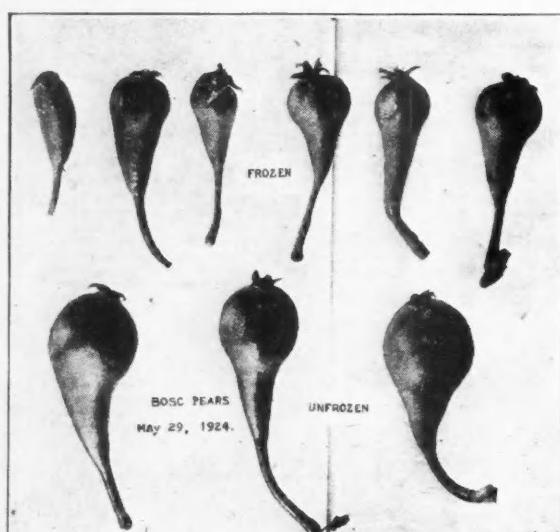
Fighting Jack Frost

(Continued from page 5.)

half an orchard properly than to try to heat the whole orchard in a half-way manner. In the Rogue River Valley from two to three pots in each intersection of the tree rows are used, and just enough pots are lighted to maintain the temperature desired. Where trees are planted 70 to the acre, this will give from 150 to 220 pots per acre. Many nights only 20 to 40 pots per acre are lighted, depending upon the night. This number of pots will raise the temperature from one to two degrees. On colder nights from 50 to 100 pots will be lighted, and with this number burning, the temperature can be raised as much as seven degrees. In this district, this type of smudge pot will burn from two to three hours. On nights when it is necessary to be-

enter into the matter of killing temperatures, such as humidity, duration of temperature, condition of trees, and many other factors. In other words, fruit may stand a minimum temperature one night of 26 or 27 degrees, and not be damaged materially, while the next night a temperature of 28 or 29 degrees, where the duration has been for two to four hours, has resulted in a complete loss of crop. Again, in firing an orchard, one must not watch the thermometer when it is standing at 28 or 29 degrees for several hours, and think that the crop will pull through. When the temperature falls below 30 degrees, and there is any chance of it staying there for an hour or more, the best advice is to begin firing and keep the temperature above 30 degrees. Light just enough pots to raise the temperature and hold it. It is a good plan to have one thermometer to about each five to 10 acres, and they must be watched constantly, and firing must be done according to the grower's own feelings. Thermometers used in orchard heating should be sheltered overhead and on the back side by a 12 by 18-inch board on top and the same for the back. Face the thermometer toward the north; this is important and should not be neglected. Torches holding about one gallon of fluid are generally

used. A mixture of one-half distillate of gasoline and one-half kerosene will light pots quickly and safely.



Frozen and unfrozen fruit after an April frost. The damaged fruits often hang until June or later, and some of them reach maturity but are second class
BOSC PEARS
MAY 29, 1924.

gin firing between 12 and two o'clock, it will be necessary to light two batteries or more. In other words, the first lighting will burn out around three or four o'clock, and another set of pots is lighted to carry through to morning. It has been found that frost usually comes for two or three nights in succession, and it is a good thing to have some oil carried over in the pots for the second night's work, because many times it is difficult to refill all the pots during the day.

Cost of Equipment

The cost of equipping the average orchard in this district is approximately \$60 per acre; \$50 for pots and \$10 for the cost of torches, thermometers, supply and storage tanks, and other incidentals. It is difficult to state the labor cost, as it will vary in different orchards, but ordinarily one man can take care of five acres.

One of the most important factors in orchard heating in the past, which has been abused by many orchardists, is that of accurate thermometers. Too much stress cannot be laid upon this point, and it is extremely important that the orchard owner should provide himself with accurate thermometers that can be easily read at night. The growers of the Rogue River Valley are now using special thermometers manufactured especially for orchard heating, with a scale running from zero to 70 degrees above zero. This makes it possible for a wider space between degrees, and such thermometers may be read to a quarter of a degree with ease.

Methods of Rogue River Valley

The frost work of the Rogue River Valley section is confined to the spring of the year, usually just before blossoming time, through blossoming and up until the fruit is about one-half inch or more in diameter. Damaging temperatures range from 30 degrees and lower. Most of the firing is done at 28 degrees. However, many factors

Rejuvenation of Old Fruit Trees

(Continued from page 41.)

and one of the scientists in an agricultural institution in Barcelona said there was no doubt but what these trees were 1000 years old and possibly 2000.

I have looked with care in many of the Mediterranean countries where civilization is very ancient, to find out how they handled their old orchards. However, to my surprise, I found very few of what we would call extremely old trees. They do not have them any more than we do in this country. Whether they cannot prevent them from dying off or do not regard the old ones as being worth saving, I cannot say. In the Island of Majorca where the land has been under cultivation for over 3000 years, and where almonds have been grown for centuries, I never saw a tree that I would rate as being more than 75 years old. We have numerous almond trees in California between 50 and 60 years of age, but many of them look like they were good for another half century.

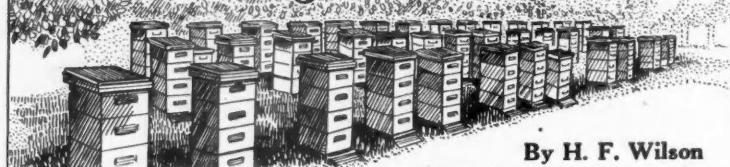
Since it seems impossible to settle the question as to how long we may expect trees to live, the most practical thing we can do is to take them as we find them, and when they seem to be growing old, simply admit to ourselves that senile decay is about to set in and take measures to revive them.

Foreman—"Here, now, Kelly, what about carrying some more bricks?"

Kelly—"I ain't feeling well, guv'nor; I'm trembling all over."

Foreman—"Well, then, lend a hand with the sieve."—Ex.

Beekeeping for Fruit Growers



By H. F. Wilson

Treating Foulbrood Combs in the Winter

IT WOULD be very difficult indeed to estimate correctly the losses caused each year by American foulbrood, but we may safely say that it is in the hundreds of thousands of dollars. The losses may be classified as follows:

1. The loss of surplus crops due to this lack of bees.

2. The cost of labor involved in treating diseased colonies and destroying the combs.

3. The cost of foundation and frames destroyed in getting rid of the disease.

Until a few years ago there was no way to save either extracted or brood combs from diseased colonies, and all that could be done was to melt them into wax. However, with the development of the alcohol formalin solution by Mr. Hutzelman, a means has been provided whereby the beekeeper can save the brood combs as well as extracting frames, and the loss is thereby considerably reduced. In the consideration of treating the combs from diseased colonies, the beekeeper should give very careful consideration to the cost of treatment and the possible net returns.

The Hutzelman solution will absolutely destroy the disease germs of American foulbrood, and when properly treated, these combs are safe to put back on healthy colonies of bees. But, in the process of treating disease-bearing combs, the beekeeper must be extremely careful not to scatter honey about so that the bees can get hold of it and carry it into healthy colonies and thus spread the infection.

If a beekeeper has 10 or more colonies of bees and finds only one diseased colony in his yard, it will pay him to destroy that colony immediately rather than try to save the honey and the combs, because, invariably, during the process of treating, infected honey is exposed to other colonies. Also, careless handling of the diseased honey in the honey house may cause it to be smeared on clean frames and when these frames are put back into the hives next spring, the disease will spread into new colonies. If a beekeeper has a large number of diseased colonies and his frames have become mixed so that he does not know which are clean and which are not, it will pay him to treat with the alcohol formalin solution. The method of treatment is simple, and considering the value of the combs, the cost is not high, although many of our beekeepers have a feeling that such is the case. It is true that the value of brood combs is figured at 25 cents each by some beekeepers, but a well drawn comb, drawn out on a full sheet of foundation, cannot be secured for less than a dollar's worth of frame, foundation and effort on the part of the bees to build. Treatment with the Hutzelman solution should not exceed five or six cents per comb, which is a very low cost.

Preparation of Combs for Treatment

Now, we will suppose that we have several hundred brood and extracting frames have been held over from diseased colonies of last summer. First, we will take the extracting frames, go over each of these very carefully and see that every cell is uncapped and open. Then soak these in ordinary cold water for from 24 to 48 hours, or until all of the honey which may be left in these combs after extracting

has been dissolved out. Remove from the water, place in an extractor, throw out the water left in the cells, and allow the combs to dry thoroughly. When dry, put them into the alcohol formalin solution for 48 hours. They should then be removed and run through an extractor to throw out the alcohol formalin solution. In this latter process, get the frames as free of the solution as possible in order not to waste material. After the combs are treated, stack them away in a dry, warm place if possible. Be careful to see that they do not come in contact with uncleaned equipment that has been used in connection with the diseased colonies.

In treating the brood combs, go over each comb carefully, as in the case of the extracting frames, and see that every cell containing honey is uncapped and open. Extract as much honey as possible before treating and then handle the same as for the extracting frames. It is unnecessary to open up cells containing dead brood as the solution will penetrate through the brood cappings and destroy the germs in cells containing dead larvae.

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Any kind of a metal tank with the proper dimensions can be used for treating the combs. A number of satisfactory containers may be made by using old second-hand honey cans, the top of which should be removed, and a half of another five gallon can be soldered on to the top so as to hold sufficient liquid to cover the frames, stood on end in these cans.

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